COORDINATED HIGHWAYS ACTION RESPONSE TEAM
STATE HIGHWAY ADMINISTRATION

CHART II
Operations & Maintenance Guide

Release 1 Build 2A

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1 INTRODUCTION

1.1 Purpose

The document provides operations personnel with information required for the administration and operation of the CHART II system. The document is intended for use by CHART II system administrators as a companion to the CHART II User's Guide.

1.2 Scope

This document covers system operations and maintenance activities for the MDSHA CHART II system. This includes CHART and FMS servers, and CHART clients. The document consists of four sections. Section 1 contains introductory material. Section 2 presents an overview of the operations and maintenance of the system. Section 3 deals with routine operations and Section 4 with maintenance and problem reporting activities. Appendix A contains installation instructions for the system.

1.3 Applicable Documents

Additional materials providing supporting information are listed below.

1. *CHART II System Requirements*, May 5, 2000, M361-RS-002R2.
2. *CHART II Business Area Architecture Report*, April 30, 2000, M361-BA-005.
3. *CHART II Users Guide*, M363-UG-002R0.
4. *TELE-SPOT 3001 Sign Controller Communications Protocol*, document number 750208-040 v2.3, T-S Display Systems Inc., 1995
5. *Functional Specification for FP9500ND – MDDOT Display Control System*, document number A316111-080 Rev. A6, MARK IV Industries Ltd., 1998.
6. *Maintenance Manual for the FP1001 Display Controller*, document number 316000-443 Rev. E, Ferranti-Packard Displays, 1987
7. *FP2001 Display Controller Application Guide*, document number A317875-012 Rev. 8, F-P Electronics, 1991
8. *Engineering Specification - Brick Sign Communications Protocol*, Rev. 1, ADDCO Inc., 1999.
9. *PCMS Protocol version 4*, document number 32000-150 Rev. 5, Display Solutions, 2000
10. *BSC Protocol Specification (Data Link Protocol Layer)*, v. 1.3, Fiberoptic Display Systems Inc., 1996
11. *Sylvia Variable Message Sign, Command Set 9403-1*, v. 1.4, Fiberoptic Display Systems Inc., 1996

2 OPERATIONS AND MAINTENANCE OVERVIEW

2.1 System Overview

Driven by the requirements of the CHART II system and taking into account guidelines for a national ITS architecture, the CHART II system is designed as a distributed object system utilizing the Common Object Request Broker Architecture (CORBA) as the base architecture.

Refer to document M362-DS-005R0, R1B2 High Level Design, for a detailed explanation of the system software architecture.

The R1B2A version of CHART II is deployed as a single server system with the CHART II server located at the SOC. CHART II clients gain access to the server either locally over the LAN at the SOC or remotely via the CHART Backbone network. The R1B2A system incorporates the following additions/changes over the R1B1 system:

1. Support for additional DMS types
2. Maintenance mode functions
3. Event log for capturing event information
4. Operational DMS control restricted to open events
5. Redesigned and simplified FMS

Figure 2-1 depicts the R1B2A system and network architecture.

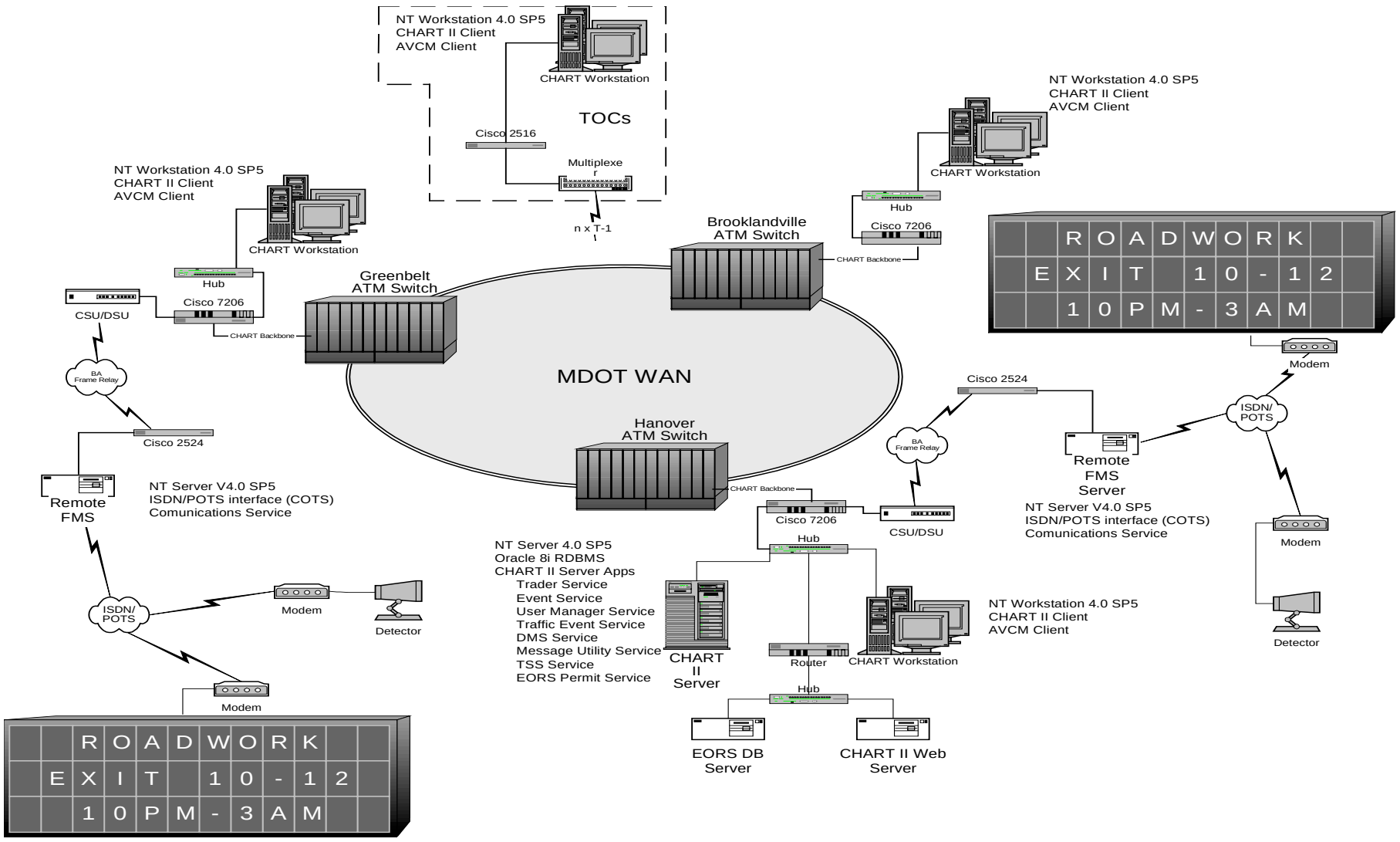

Figure.2–1 CHART II Release 1 Build 2A Network Architecture

2.2 Organizational Overview

The responsibilities for the operation and maintenance of the CHART II system are divided into three areas: System Operation, System Management, and System Maintenance.

2.2.1 System Operation

The operation of the CHART II system is the responsibility of the MDSHA CHART operations staff.

2.2.2 System Management

The management of the CHART II system is handled jointly by CSC and MDSHA CHART personnel. CHART II and computer system administration functions are carried out by MDSHA personnel. Database administration functions, system backups, and network management are handled by CSC.

2.2.3 System Maintenance

The maintenance of the CHART II system is the responsibility of the CSC team. The CSC team provides bug fixes as needed and system updates and new releases as scheduled. In addition, CSC provides maintenance on all hardware other than the actual field devices.

3 ROUTINE OPERATIONS

3.1 Operations Overview

This release of the CHART system consists of multiple FMS servers, and a single CHART server supporting multiple client workstations. The functions supported are listed below. New functions for this release are indicated by **bold** type.

- User management
  - add, delete, modify user accounts
  - define user roles
- Device management and control
  - add, delete, modify DMS configuration information
  - **set DMS online, offline, maintenance mode, reset DMS**
  - **add, delete, modify TSS configuration information**
  - **set TSS online, offline, maintenance mode**
  - **add, delete, modify port configuration information**
- Message Libraries
  - Create/delete message libraries
  - Create/delete library messages
- Plan Libraries
  - Create/delete plan libraries
  - Create/delete plan items
- Operations Log
  - Log user activity
  - Log system and device status information
- **System Management/Monitoring**
  - **Provide FMS communications and port status**
  - **Support device communications failover between FMS servers**
- **Communications Log**
  - **Create/manage communications log entries**
- **Event Log**
  - **Create/manage events**
  - **put message on DMS, blank DMS, turn DMS beacons on/off**

- Dictionaries
    - Banned words dictionary
    - **Spell-check dictionary**
- **User Utilities**
    - **CHART Chat**

3.2 Operations Principles

The CHART II system operates 24 hours per day, 7 days per week. The system is designed to free CHART operators from system management functions so that they may concentrate on performing CHART functions. To that end, the system requires little in the way of *care and feeding*. Routine system management functions such as backups are automated and require only a periodic check to verify they have completed successfully. While the R1B2A CHART system is deployed on a single server, future releases will be deployed in a distributed multi-server environment. In this distributed environment, data distribution and replication will be handled automatically by the system.

The configuration of the system for use, such as adding new users or devices, and the monitoring of system status are the primary non-CHART functions required for the operation of the system.

3.3 Operations Personnel

The operation of the CHART II system requires two types of users: CHART operators and CHART system administrators.

A least one user of the system must perform the functions of the system administrator. The system administrator creates user accounts, adds new devices to the system, controls the contents of the banned words dictionary, and monitors the operation of the system.

CHART operators use the CHART II system to manage events and to control and monitor devices.

This document (CHART II Operations and Maintenance Guide) and the CHART II User's Guide provide the necessary documentation for the operation of the CHART II system. In addition to these guides the CHART II system has an online help function for providing user information on system functions.

3.4 Maintenance Personnel

All CHART II system maintenance functions are provided by the CSC/PBFI team. CHART II software, communications and hardware problems (excluding problems with the actual field devices) are reported to the Help Desk (410-691-6600 *or* 888-301-7272).

The following documents are available as supporting information.

CHART II R1B2A Users Guide, M363-UG-002R0.

3.5 System Startup and Shutdown

This section provides information on the startup and shutdown of the CHART II servers. There are no special instructions for CHART II workstation startup as the CHART II GUI runs as a standard application on the workstation.

3.5.1 CHART Server System Startup

The CHART II server processes will start up automatically with the startup of the NT operating system. Generally no operator intervention is required during the system boot process to make the system ready for CHART II use.

The server processes may be manually started from the NT Services Control Panel if necessary. When manually starting the CHART server processes using the NT Services control panel the following order must be maintained:

1) Oracle

2) Trader Service, Event Service

3) User Manager Service, DMS Service, Message Utility Service, Traffic Event Service

The dependencies among the services on the CHART II server are shown in the table below (Figure 3-1). There are no dependencies between the CHART II servers, clients, and remote FMS with regards to the order in which the systems are started. However, a CHART II client will require access to a functioning CHART II server before a user can login to the system. Likewise, the CHART II server will require access to a functioning remote FMS in order to successfully control devices.

Service depends on →	Oracle	Trader	Event	User Manager	Message Utility	DMS	Traffic Event
Oracle							
Trader							
Event							
User Manager	X	X	X				
Message Utility	X	X	X				
DMS	X	X	X				
Traffic Event	X	X	X				

Figure 3–1. Service Dependencies

In the event that the User Manager, Message Utility, Traffic Event, or DMS Services fail to start, see Section 3.6.1 on the application log files.

3.5.2 CHART Server System Shutdown

To perform a clean shutdown of a CHART II server system, the steps below should be followed.

1. All CHART users connected to the server to be shutdown should log off.
2. The CHART database instance on the server should be shut down.
3. The normal shutdown process for NT should be followed.

If these steps are not followed no damage to the system will result, however, the subsequent restart of the system may be slowed due to the automatic recovery processes that may be invoked.

To shutdown the CHART system without shutting down the computer systems, perform the following steps on the CHART II server using the NT Services control panel to stop processes.

1. Stop the OracleServiceSOC2 service (this will shutdown the database and cause the shutdown of the User Manager, Message Utility, Traffic Event, and DMS services if running)
2. Stop the Trader Service
3. Stop the Event service
4. Stop the User Manager, Message Utility, Traffic Event, and DMS Services, if still running

3.5.3 FMS Server System Startup

The FMS server process, CommService, will start up automatically with the startup of the NT operating system. Generally no operator intervention is required during the system boot process to make the system ready for use.

The CommService process may be manually started from the NT Services Control Panel if necessary. The CommService process does not depend on any other server processes.

In the event that the CommService fails to start, see Section 3.7.1 on the application log files.

3.5.4 FMS Server System Shutdown

To perform a clean shutdown of an FMS server, first verify that there are no current active connections. Next use the normal NT shutdown process to shutdown the system. Alternatively, to shutdown the CommService process without shutting down the operating system, use the NT Services control panel to stop the CommService process.

3.6 System Backups

The Oracle Enterprise Manager controls the backup of CHART II information to tape. See Section 3.9.4.1.

3.7 Operations Log Files

The system logs status, alert, and error information to log files. There are two types of log files: text files generated for debugging purposes, and data logged to the database for archiving. The text files include server and application log files, and device status files. The database information includes operations log entries, communications log entries, and data associated with event management.

3.7.1 Server Log Files

Application specific log files are generated by individual server applications. These files are located in the installation directory. There is one log file for each service. A new log file is automatically opened each day when the first message for that day is logged (this means there could be periods where no log files are created for a particular day if no messages are logged during that day). The files are named as follows:

CommService_yymmdd.txt (see Section A.1.4.1 for on multiple communications services)

DMSService_yymmdd.txt

EORSPermitService_yymmdd.txt

MsgUtilServiceDev_yymmdd.txt

TrafficEventService_yymmdd.txt

TSSService_yymmdd.txt

UMService_yymmdd.txt

(where yymmdd is the two digit year, month, and day of the creation of the file, (*e.g.* 000503).

To view these files while the applications are running use Notepad.

In general, messages in these files will be more useful to the maintenance staff in debugging a problem than to the operations personnel in running the system. However, in the event that a service does not start, these log files should be consulted to determine the reason. Occasionally Oracle initialization warnings will appear in the log files during startup. These warning messages occur when an application tries to connect to the database before the database has completed its startup. This situation is handled within the software so these messages appear as status only and do not indicate an error condition. An example message appears below.

> 04/12/00 01:16:32 PM Thread: main Class: CHART2.Utility.DBConnection - Error connecting to DBMS - ORA-01033: ORACLE initialization or shutdown in progress

Any Oracle messages other than the ORA-01033 message shown above should be reported to the maintenance support group.

The DMSService log file will record any errors received related to communicating with a DMS.

In the event of a problem with the system the administrator should make copies of the log files to provide to the maintenance personnel along with the problem report. Note that the CommService log files are located on the FMS servers. In the case where a problem involves

communicating with a device in the field then the appropriate CommService log file should be copied from the FMS server involved.

3.7.2 Client Log Files

The CHART GUI application generates log files in the Chart2Gui folder of the CHART installation directory. These log files contain debug information useful to the maintenance personnel in tracking down client problems. Client log files are named as follows:

logyymmdd.txt

(where yymmdd is the two-digit year, month, and day of the creation of the file, *e.g*. 000503).

When a client is started a new log file is created if one does not already exist for that day.

3.7.3 DMS Status Logs

One time each day the polled status for each DMS is logged to a flat file on the CHART II server serving the DMS. The status for all DMSs served on a particular CHART II server will share a single log file, separate from the application log file. A new log file for this purpose is created each day, with the date of the file contained in the file name. These files are located in the DMSService\DMSStatusLogs folder of the CHART installation directory. DMS Status log files are named as follows:

Status_yymmdd.txt

(where yymmdd is the two digit year, month, and day of the creation of the file, *e.g*. 000503).

3.7.4 Device Logs

Device logs capture detailed device communications information for use in debugging problems with devices. By default these logs are not enabled. To enable a device log for a specific device you must check the Device Log checkbox on the General tab of the Properties dialog for the device. These files are located in the DMSService\DeviceLogs folder of the CHART installation directory. DMS Device log files are named as follows:

Devicename_yymmdd.txt

(where Devicename is the name of the Device and yymmdd is the two-digit year, month, and day of the creation of the file, *e.g*. 000503).

3.7.5 CHART Operations Log

The CHART operations log is maintained as a database table and logs user and system actions associated with the configuration and operation of the CHART system. Messages logged to this table consist of a timestamp, username, center name, host computer name, action type, and

description. Ad hoc reporting is not part of the R1B2A system, however, the user may generate reports from this table by using the Seagate report generation tool.

Entries from the operations log are periodically saved to a separate transition database and deleted from the operational system. Typically two weeks of operations log entries are maintained in the operational system.

3.7.6 Communications Failure Log

The Communications Failure log is maintained as a database table and records error messages generated from failed attempts to communicate with field devices. An Oracle Enterprise Manager Job will create a report file from this database table in the D:\ORACLE\ADMIN\C2SOC2\REPORTS directory each morning at 12:30AM for data generated the previous day. For instance, at 12:30AM on 29-DEC-2000 a file called COMM_FAILURE_LOG001228.TXT will be created that contains all comm_log_failure records created on 28-DEC-2000. These files are not automatically purged and must be manually deleted by the administrator.

3.8 System Administration and Configuration

This section contains information on the system administration functions necessary to administer and setup the CHART II system for use. General system administration information and documentation on the system administration dialogs in the CHART GUI can be found in the CHART II User's Guide. Administration and configuration functions require appropriate functional rights and are generally reserved for system administrators.

3.8.1 User Rights

In order for users to be able to exercise CHART functions they must have the appropriate functional rights. These are assigned through roles (see the CHART User's Guide). Table 3–1 (below) shows the available functional rights.

Table 3–1. Functional Rights

Functional Right	Description
ArbitrationQueue	This right should not be granted to users. It is for internal use by arbitration queue objects only.
BasicOperations	Allows the holder to perform basic system operations such as use the comm log.
ConfigureDMS	Configure DMS. Allows the holder of this right to perform the following: Set the name of a DMS. Set the polling interval of a DMS. Set the DMS communications loss timeout Remove a DMS from the system Add a new DMS to the system.
ConfigureSelf	Configure Self. Allows the holder of this right to change his/her own password provided they can provide the current password.

Functional Right	Description
ConfigureSystem	Allows the holder to modify the system configuration.
ConfigureTSS	Allows the holder to perform the following: Add a new TSS device. Delete an existing TSS device. Set the configuration of a TSS device. Get the current configuration of a TSS device.
ConfigureUsers	Allows the holder to: Create a user. Delete a user. Create a new role Grant a role to a user. Revoke a role from a user. Delete a role from the system. Set the functional rights in a role. Change a user's password.
ForceDMSPoll	Force DMS Poll. Allows the holder of this right to force the system to poll a DMS for its current status.
HandleUncontrolledResource	Allows the holder to: Receive notification of operations centers with controlled resources and no users logged in.
MaintainDMS	Allows the holder to put a DMS in maintenance mode and perform commands on the DMS.
MaintainTSS	Allows the holder to put a TSS device in maintenance mode and perform commands on the TSS device.
ManageDeviceComms	Manage Device Comms. Allows the holder of this right to perform the following: Place a device online to allow the system to communicate with it. Take a device offline to keep the system from communicating with it.
ManageDictionary	Manage Dictionary. Allows the holder of this right to add and remove banned words from the dictionary.
ManageServices	Manage Services. Allows the holder of this right to shutdown a service.
ManageTrafficEvent	Allows the holder to change the properties of a traffic event.
ManageUserLogins	Manage User Logins. Allows the holder of this right to force a user to logout of the system.
ModifyMessageLibrary	Allows the holder to: Create, rename, or remove DMS message libraries. Add/remove a message to/from a library. Change the description or content (text and beacons) of a DMS library message. Remove a stored DMS message from the system.
ModifyPlans	Allows the holder to: Create and rename plans and plan items. Change the DMS or message used by a plan item. Add a new item to a plan. Remove an item from a plan. Remove a plan item from the

Functional Right	Description
	system and a plan.
OverrideSharedResource	Allows the holder to: Override control of shared resources that are controlled by other operations centers.
ResetDMS	Reset DMS. Allows the holder of this right to reset a DMS controller.
ResetDMSGroup	Reset DMS Group. Allows the holder of this right to reset a group of DMS controllers.
RespondToTrafficEvent	Allows the holder to manage the response to a traffic event.
SetDMSMessage	Set DMS Message. Allows the holder of this right to perform the following: Blank a DMS. Set the current message on a DMS.
TrafficEventService	This right should not be granted to users. It is for internal use by the traffic event service only.
TransferAnySharedResource	Allows the holder to: Transfer control of a shared resource from one operations center to another.
UsePlans	Use Plans. Allows the holder of this right to perform the following: Activate a plan and all of the items in the plan.
ViewDictionary	View Dictionary. Allows the holder of this right to get the current list of banned words from the dictionary.
ViewTrafficEvent	Allows the holder to view traffic event related information.
ViewTSSConfig	Allows the holder to get the current configuration information for a TSS device.
ViewUserConfig	Allows the holder to: Get the list of all users. Get the list of all roles. Get the list of functional rights that are assigned to a role. Get the list of roles that a particular user has been granted.
ViewUserLogins	View User Logins. Allows the holder of this right to get a list of users currently logged into the system.

3.8.2 Properties Files

CHART II applications make use of properties files containing parameters to control application behavior. The properties files are located in the installation directory under the folders for each application. The table below lists each application and its corresponding properties file. Each file is self-documenting.

Table 3–2. Properties Files

Application	Properties File
CHART II GUI	Chart2GUI.props
DMSService	DMSService.props
EORSPermitService	EORS.props
MsgUtilityService	MsgUtilityService.props
TrafficEventService	TrafficEventService.props
TSSService	TSSService.props
UMService	UMService.props
CommService	CommService.props

In general the parameters in each file should be left set to their installed values. There are certain parameters that may require modification during the normal course of system operation. These are listed in the table below.

Changes to the properties files will not take effect until the corresponding service is restarted.

Table 3–3. Properties File Parameters

Application	Parameter	Usage
All services	DefaultServiceApplication.LogFileLevel	Value set to 'production' under normal operational conditions. Value set to 'debug' when a problem with a service is suspected. Setting the value to debug causes the application to write detailed debug information to the application's log file.
All services	DefaultServiceApplication.LogFileKeepDays	Sets the number of days of log files to retain online for this application.
CHART II GUI	GUI.LogLevel	Value set to 'production' under normal operational conditions. Value set to 'debug' when a problem with the GUI is suspected. Setting the value to debug causes the application to write detailed debug

Application	Parameter	Usage
		information to the application's log file.
CHART II GUI	GUI.LogKeepDays	Sets the number of days of log files to retain online for this application.
CHART II GUI	GUI.CompletedCommandStatusRemovalDelaySeconds	Controls how long command status entries are displayed in the command status window.
CHART II GUI	GUI.OperationsCenterName	Operations Center for this GUI
Traffic Event Service	TrafficEventModule.OfflineThresholdHours	Specifies the time period in hours after which a closed traffic event will be removed from the system.
Traffic Event Service	TrafficEventModule.EORSPermitLookupInterval	Specifies how frequently to poll the trader for EORS permits in minutes.
User Management Service	ResourcesModule.LoginSessionCleanupInterval	Specifies how frequently (in minutes) to have each operations center object cleanup invalid login sessions (e.g. sessions that were terminated by means other than a proper logout). The operations center will have to ping each login session in order to perform this task.
User Management Service	ResourcesModule.LoginSessionDisconnectTime	Specifies the interval (in minutes) that should pass after the last successful ping before a logged in user session will be considered invalid. The value of this property should be at least three times greater than the cleanup interval; otherwise it will be ignored and a user session will be disconnected if it cannot be successfully pinged for a period of time equal to three cleanup intervals.

3.8.2.1 User Preferences

Most user preference information is maintained in the database so that it is available to the user no matter where the user logs into the system. Certain preference information related to window sizes and positions that is display dependent is maintained on the local workstation. This information is written to a file named [username].txt in the \bin\Chart2GUI folder.

3.8.3 FMS Port Configuration

The Port Manager Utility is used to set the configuration of communications ports on FMS Servers. The Port Manager Utility is located in the CommService installation directory and is activated by running PortConfigUtil.cmd on the FMS Server.

> *If running the port manager configuration utility remotely using Remotely Possible you must set the FMS server's display properties characteristics to 800x600 and 256 colors (right click in*

the display and select Properties and then Settings). After starting the port manager configuration utility click on the Test button in the display Setting dialog. The port manager configuration utility window should now display properly. Each time you start the utility you must click on the Test button in the display Settings dialog.

Use the File menu to select a configuration file (Figure 3-1). The configuration file is specified in the CommService.props file and defaults to PortConfig.pcfg. After selecting a configuration file a list of ports is displayed (Figure 3-2). To edit an existing entry select the entry and either right-click or use the Edit menu item. A pop-up menu will appear with options to add direct connections, POTS modems, ISDN modems, or to edit the selected entry.

Editing an entry or creating a new entry will display a window similar to those shown in Figure 3-3. To edit an entry, simply modify the fields as desired. For new port entries enter a name to identify the port, check the Port Enabled box to enable the port, and then specify the system device name for the port (*e.g.* COM1). It is recommended that the system device name be used for the port name to avoid confusion (*e.g.* system device COM1 is given port name COM1). For the modems you will also need to enter the modem initialization string (see below) and the modem connect timeout (the length of time in minutes the modem will wait for a connection to be established after dialing). Use care in entering the initialization strings to make sure that the number zero is not entered as the letter O.

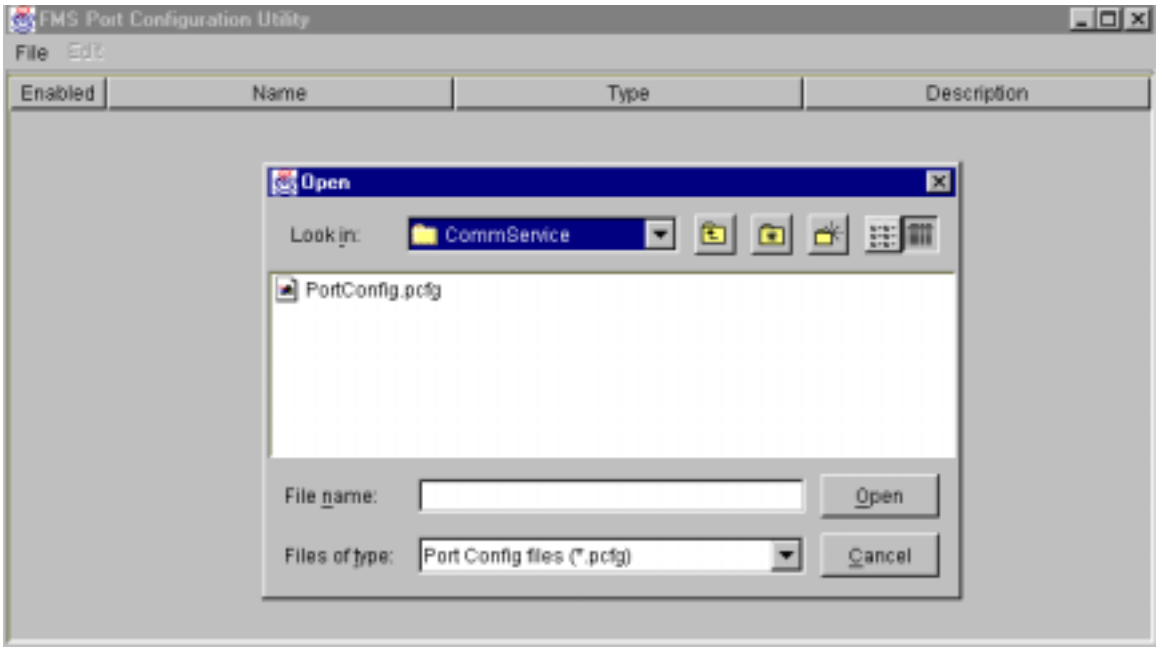

Figure 3-1 Port Configuration Utility

Modem Initialization Strings:

- Eicon ISDN ATE0Q0V1+ip6
- Digi ISDN ATE0Q0V1
- POTS AT&F0E0Q0V1F4&K0&Q4+MS=1,0,300,1200

When you have finished setting the port configurations make sure you use the File menu to save your changes before exiting the application.

Changes to the port configurations will not take effect until the CommService is restarted.

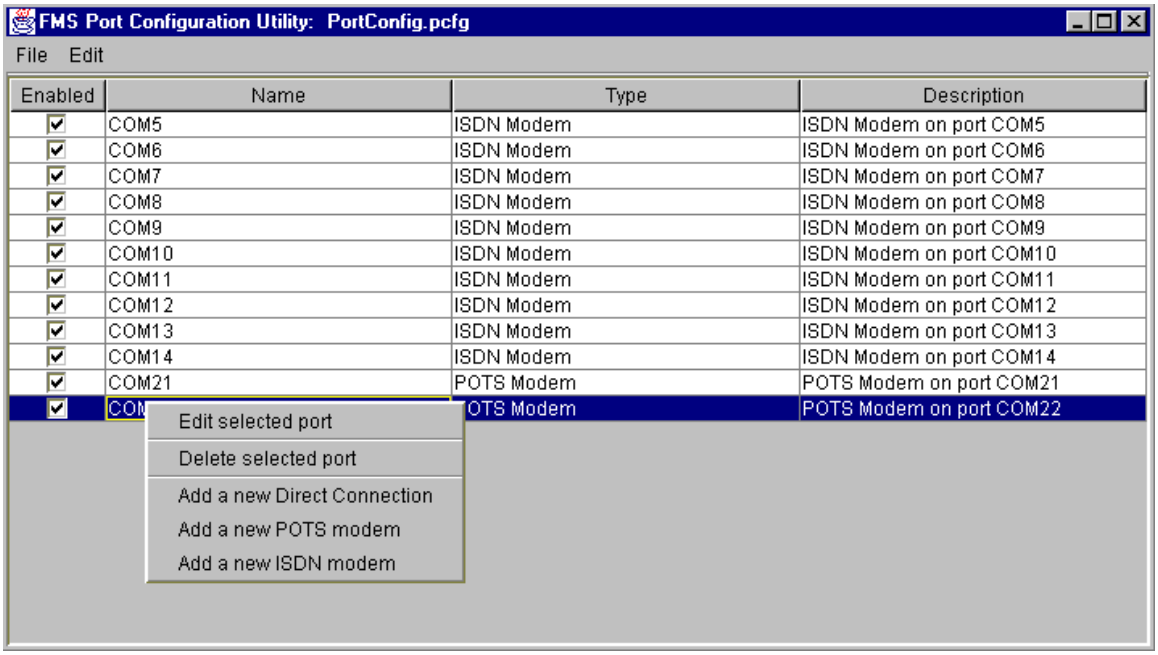

Figure 3-2 Port Configuration List

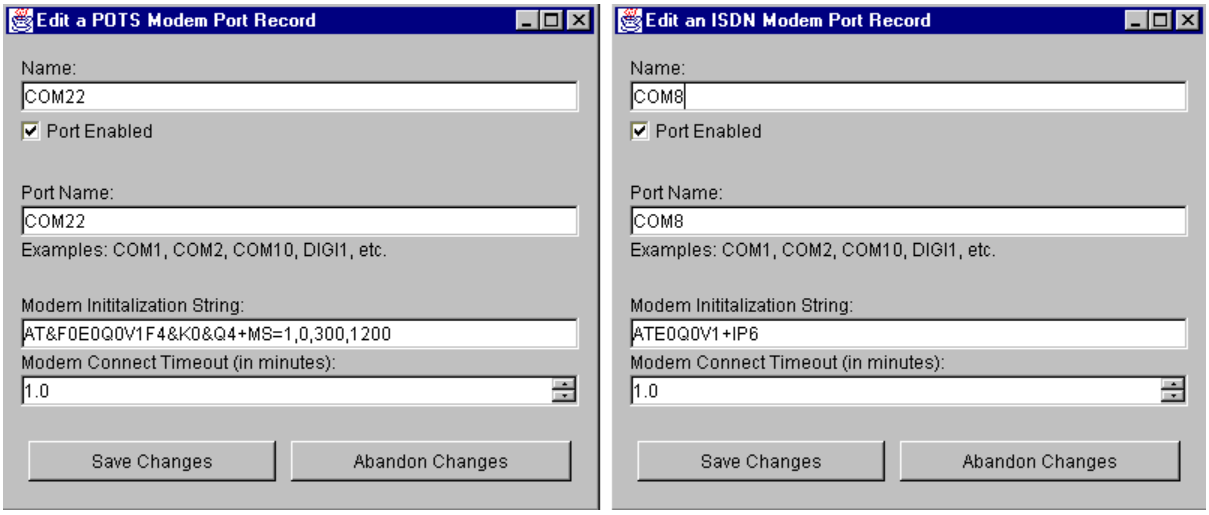

Figure 3-3 POTS and ISDN Port Configuration

3.8.4 Device Configuration

This section describes the steps necessary to establish valid device configurations. Details on using the CHART II GUI to define devices are presented in the CHART II User's Guide.

3.8.4.1 DMS Devices

To add a DMS to the CHART system and configure it for use, the administrator uses the DMS Properties dialog. Prior to bringing up the DMS Properties dialog, the administrator should gather the information on the sign characteristics and communications parameters needed to configure the device. Appendix C contains a form that can be used to record the information.

3.8.4.2 TSS Devices

To add a TSS device to the CHART system and configure it for use, the administrator uses the TSS Properties dialog. Prior to bringing up the TSS Properties dialog, the administrator should gather the information on the device characteristics and communications parameters needed to configure the device. Appendix C contains a form that can be used to record the information.

Note that a TSS device in maintenance mode will continue to be polled, unlike message devices such as a DMS. To prevent a TSS device from being polled by the system the device must be set to offline.

3.9 Database Operations and Maintenance

This section provides information to the CHART II Database Administrator (DBA) to facilitate administration of the CHART II databases.

3.9.1 Environment

Currently, the development DBA works remotely from the Network Operations Center (NOC). When the system goes to final production, the name and location of the Enterprise Manager Client will be substituted for the NOC. All instructions are assuming a local environment at the SOC.

Table 3–4. Client Environment

Client	Description
Enterprise Manager Workstation (Client)	The name of this workstation is HC026561. It is currently located in the Network Operations Center (NOC). This workstation will be used to configure the Enterprise Manager for the CHART II database. The following Oracle software must be installed: • Oracle 8i Enterprise Edition (Client) • Enterprise Manager, Release 2.0.4 (Server&Client) • Net8

Currently CHART II exists on a single server at the SOC. When the database is distributed in future releases, the list of servers will be identified in this section. Installation of the databases can be done remotely from wherever the workstation resides. Conversely, the installation can be done locally at each site. The DBA can choose which option is more convenient.

Table 3–5. Server Environment

Server	Description
Database Server	The name of the CHART II database server is HANOVERCHART1. It is located in the SOC. The following Oracle software must be installed prior to installation of the CHART II database: • Oracle 8i Enterprise Edition • Net8 • SQL*Loader(Part of Oracle Utilities)

Table 3–6. CHART II Databases

Database Name	Description
C2SOC2	CHART II operational database which resides on the database server in the SOC.
C2ARCH2	CHART II Interim Archive database which resides on the database server in the SOC.
EMREP	Enterprise manager database which resides in the NOC on a workstation called HC026561.

Table 3–7. CHART II User IDs

Username	Description
ARCHIVE	CHART II user for archiving data. Currently not used.
ARCHIVE_USER	CHART II Interim Archive user for performing ad-hoc queries. This user has select privileges on all tables in CH2DBA schema.
DBSNMP	CHART II Oracle database user ID. Used by the Oracle Intelligent Agent.
CH2DBA	CHART II schema owner CHART II Interim Archive schema owner
DMSSERVICE	CHART II user for the CHART2-DMSService service
INTERNAL	CHART II Oracle database user ID
MESSAGEUTILITYSERVICE	CHART II user for the CHART2-MsgUtilityService service
ORACLE_BACKUP	Window NT user account on the database server. This account will have the necessary privileges to perform CHART II database backups.
OUTLN	CHART II Oracle database user ID - pre-configured Oracle user.

Username	Description
REPORT	CHART II user for performing ad-hoc queries. This user has select privileges on all tables in CH2DBA schema.
RMANCHART2	Enterprise Manager database user. This user's schema contains the Backup and Recovery Catalog information for the C2SOC2 and C2ARCH2 database backups. C2ARCH2 database user. This user's schema contains the Backup and Recovery Catalog information for the Enterprise Manager database backups.
SYS	CHART II Oracle database user ID- highest Oracle system database privilege.
SYSMAN	Enterprise Manager user ID
SYSTEM	CHART II Oracle database user ID - DBA administrative privilege.
TRAFFICEVENTSERVICE	CHART II user for the CHART2-TrafficEventService service
TSSSERVICE	CHART II user for the CHART2-TSS service
USERMANAGEMENTSERVICE	CHART II user for the CHART2-UserManager service

The Windows NT user who installs the CHART II database will require administrative rights on the CHART II database server.

Table 3–8. Oracle Tools

Tool Name	Description
Enterprise Manager Console	Enterprise manager Graphical User Interface (GUI) that provides the capability to centrally manage databases.
Security Manager	Enterprise manager GUI that provides the capability to manage users, roles, and privileges within a database.
Storage Manager	Enterprise manager GUI that provides the capability to manage tablespaces and datafiles within a database.
RMAN	Oracle recovery manager utility that provides the capability to backup and recover oracle databases.
TCL	Tool Command Language (TCL). Interpretive programming language that ships with Oracle8i. Some of the Enterprise Manager jobs are implemented as TCL programs.

3.9.2 Responsibilities of the Production CHART II DBA

The responsibilities of the CHART II production DBA include the performance of the maintenance tasks in Table 3–9. If additional servers are added after delivery of the CHART II system, the production DBA will be responsible for performing all of the installation and setup tasks in Appendix A for each additional database and server.

Table 3–9. Database Maintenance Tasks

Responsibility	Frequency	Reference
Monitor Enterprise Manager Job status for the Jobs listed in Section 3.9.3.1	Daily	3.9.3.1
Monitor Enterprise Manager Events for the events listed in Section 3.9.3.1	Daily	3.9.3.1
Change CHART II DMS Status log Purge parameter	As necessary	A.4.6.3
Recover C2SOC2 database	As necessary	3.9.5
Recover C2ARCH2 database	As necessary	3.9.6
Recover Enterprise Manager database	As necessary	3.9.7
Upgrade Oracle products	As necessary	See Oracle documentation
Tune databases	As necessary	See Oracle documentation

3.9.3 Routine Database Maintenance Operations

Maintenance of the databases will be primarily performed through the Enterprise Manager tool located on workstations in the Network Operations Center (NOC), Hanover facility. All database management, except database recovery, will be performed with this management tool.

The bulk of the maintenance tasks are automated. These include database backup, tape backup, removal of aged files from disk, and monitoring the status and performance of the databases. Two Enterprise Manager features provide this automation: Jobs and Events. Jobs perform a task on a daily basis, such as backing up the database. Events monitor the databases or servers for specific conditions, such as a downed database. An alert is sent to the user when the specific condition occurs.

Instructions for Enterprise Manager setup can be found in Appendix A of this document.

The DBA can monitor the system through Enterprise Manager Console that includes:

1. Instance manager
2. Schema manager
3. Storage manager
4. Security manager

Each provides monitoring and management capabilities with regard to specific DBA functions. These include management of individual instances with regard to shutdown and startup, table information regarding the schema, datafile storage and user security.

The maintenance functions for the DBA are organized into the following categories:

- Monitor - this section contains guidelines for monitoring the database.
- Procedures - this section contains procedures for the DBA to perform.

3.9.3.1 Monitoring the Databases

The CHART II databases and Enterprise Manager database are monitored via the Oracle Enterprise Manager Console's Job pane and Event pane. The Enterprise Manager Console should be viewed daily to determine the status of the databases.

Jobs

The Job pane displays information regarding the jobs that run periodically, including: daily backups of the three databases, daily tape backups, and daily removal of aged backup files from the hard drives. The Job pane displays the success or failure status of each job and provides details if the job failed.

The DBA should view the Job pane's History tab daily to verify that all jobs have a status of "completed." The following jobs should appear:

a)	backup C2SOC2 database	1:30 AM
b)	backup C2ARCH2 database	1:45 AM
c)	backup Enterprise Manager database	3:30 AM
d)	C2SOC2 Export Job	2:30 AM
e)	DLT tape backup	3:00 AM
f)	remove aged database backup files	2:45 AM
g)	remove aged Enterprise Manager database backup files and copy latest files to network drive	3:45 AM
h)	remove aged CHART II DMS Status log files	3:15 AM
i)	Daily Comm_Failure_log Report	12:30 AM
j)	process CHART II TSS Raw Data files	12:45 AM

Events

The Event pane assists the DBA with automatic problem detection and correction. Using Events, the DBA can establish thresholds for warning and alert conditions. The following events are monitored every 300 seconds for the C2SOC2, C2ARCH2, and EMREP databases:

a) Alert - new errors in the Alert file
b) Probe - database connection cannot be made
c) Buffer Cache - buffer cache hit ratio is low
d) Database UpDown - Database is down
e) Data Dictionary Cache - dictionary cache hit ratio is low
f) In Memory Sorts - in memory sort ratio is low
g) Node UpDown - Database Server is down
h) Redo Log Allocation - redo log allocation hit ratio is low
i) Rollback Contention - rollback segment contention is high

The Event pane also displays status information regarding the Oracle Job in the C2ARCH2 database that is responsible for copying the log data and purging aged log information. For information about fixing a failed archival job, see Section 3.9.3.2.

When the value for one of these items exceeds a threshold value, a new row will appear in the Event Pane to alert the operator of the situation.

3.9.3.2 Monitoring CHART II Archival Job Status

The mechanism used to automatically transfer the operational data from the C2SOC2 database to the C2ARCH2 database is an Oracle job in the C2ARCH2 database. The job is created as part of the creation of the C2ARCH2 database. The job is scheduled to run daily at 1:00AM.

If a job fails for some reason, Oracle will retry up to 16 times. If the job successfully executes before the 16th failure, then the job status returns to normal. If the job fails sixteen times, Oracle will mark it as broken and essentially disables the job. A DBA must remove the job and resubmit it.

If an Event has been posted that indicates the job has failed, check the d:\oracle\admin\c2arch\bdump directory for a C2ARCH2SNP#.TRC file, where # is some digit. Open it in Notepad and look for the error that is causing the job to fail and fix the problem.

If an Event has been posted that indicates the job is broken, then Oracle has disabled the job and will no longer execute it. Check the d:\oracle\admin\c2arch2\bdump directory for a C2ARCH2SNP#.TRC file, where # is some digit. Open it in Notepad and look for the error that is causing the job to fail and fix the problem. The DBA must remove the job and resubmit after fixing the problem that caused the job to fail.

Perform the following to remove the job and resubmit it.

1. Log into the C2ARCH2 database using the CH2DBA user via SQL*Plus
2. Type `@d:\oracle\admin\c2arch2\create\designer\cr_c2arch2.prc` at the prompt and press the ***Enter*** key.

3.9.4 Procedures

There are tasks that the DBA must perform that are not automated. These tasks include the following:

1. Backup Tape Usage Procedures
2. Restore Files from Tape Backup
3. Recover C2SOC2 database
4. Recover C2ARCH2 database
5. Recover EMREP database

3.9.4.1 Backup Tape Usage Procedures

Backing up the database backup files to tape provides a means to restore the data in the event the d: drive crashes or becomes corrupt. All backups will be full, rather than cumulative or incremental, due to the relatively small size of the backup files. The tape backups are automated; however, there is currently only one tape in the DLT. Since the tape backups are automated (scheduled to occur at 3:00AM each morning, the procedure consists of replacing the tape in the DLT drive each day of the week.

1. Label tape 1 with the following days: MON, THU
2. Label tape 2 with the following days: TUE, FRI, SUN
3. Label tape 3 with the following days: WED, SAT
4. On Monday after 5:00AM, remove the current tape cartridge and insert the cartridge labeled MON.
5. Repeat step 4 on each of the days of the week using the corresponding cartridges.

This weekly process continues by repeating steps 4 and 5 using the same cartridges.

Follow the tape manufacturer's directions for replacing the tapes to ensure quality and integrity.

Periodically, verify that the items you backup can be restored.

3.9.4.2 Restore Files from Tape Backup

The following procedure restores files from tape to the hard drive.

1. Insert the latest tape into the DLT tape drive.
2. At the HANOVERCHART1 server, Click on the following: **Start…Programs…Administrative Tools (Common)…Backup**. The backup window appears.
3. Select **Windows…Tapes** from the menu. The Tapes window appears.
4. Click the box for the latest entry so that an "X" appears.
5. Click the ***Restore*** button on the tool bar. The Restore information window appears.
6. Check the "Verify After Restore" checkbox and click on the ***OK*** button. The Restore Status window appears with the ***OK*** button disabled. When the restore operation is complete the ***OK*** button will be enabled.
7. Verify that "The operation was successfully completed" is displayed as the last line in the Summary window.
8. Click the ***OK*** button. The Restore Status window closes.
9. Close the Backup application.

3.9.5 Recovery Procedures for CHART II Database

The recovery procedures for an Oracle database are varied depending on the circumstances that required a recovery to be performed. The procedures provided below assume a full database recovery, whether all of the database files are lost or not. Two recovery scenarios are provided as follows:

- Normal Recovery – Use this procedure if the database has crashed and will not start and the D: drive has not crashed. The database is in this state if you attempt to connect via SQL*Plus and get the Oracle Not Available error and attempting to start the OracleServiceSOC service from Control Panel fails.
- Disaster Recovery – Use this procedure if the D: drive containing the database fails and all database files are lost. **Disaster recovery can only recover data up to the last backup. Data entered since the last backup will be lost. This is due to the fact that all database files are on the D: drive. If the D: drive crashes then the only remaining media is the DLT tapes.**

3.9.5.1 Normal Recovery

Implement the following procedures if the database control files, online redo logs, and archived redo logs are available and not corrupt.

Recovery of the database involves the following steps.

- Shutdown the database.
- Delete the current datafiles.
- Restore database backups to the d:\oracle\oradata\backup directory.
- Recover the database. The recovery process will decompress the database files and put them back into the d:\oracle\oradata\c2soc2 directory. The recovery process will also decompress archive log files and restore them to their original location. Finally, the recovery process will apply changes to the database from the redo logs to recover changes made to the database since the last backup.

Detailed steps are as follows:

1. From the Enterprise Manager workstation, logon to the Enterprise Manager Console.
2. In the Navigator pane, double click on the Databases item to view the list of databases.
3. Click the right mouse button on the C2SOC2 database. A pop-up menu appears.
4. Select ***Shutdown*** from the pop-up menu. The Shutdown Options window appears.
5. Select the ***Abort*** radio button and click the ***OK*** button. If you receive an "Oracle Not Available" error message, then the database is already shutdown. Leave Enterprise Manager open and proceed to the next step.
6. After the database is shutdown, use Explorer to connect to the target server's d:\oracle directory.

7. Navigate to the **d:\oracle\oradata\backup** directory and verify that the latest CHART II database backup files are in the directory. If they are not, use the procedures in Section 3.9.4.2 of this document to restore the latest files to this directory.
8. Navigate to the target server's **d:\oracle\oradata\c2soc2** directory.
9. Copy these files to another directory, in case the restore fails.
10. Delete the *.dbf files in the **d:\oracle\oradata\c2soc2** directory.
11. Return to the Enterprise Manager Console.
12. Right click on the C2SOC2 database. A pop-up menu appears.
13. Select ***Startup***. The Startup Options window appears.
14. Select the ***Mount*** radio button in the Startup Mode group box and click the ***OK*** button. A progress indicator will appear briefly. Then a message box will appear stating: Oracle instance mounted.
15. Click the ***OK*** button to close the message box.
16. Click the right mouse button on the C2SOC2 database. A pop-up menu appears.
17. Select ***Backup Management > Recovery*** from the pop-up menu. The Recovery Wizard Introduction window appears.
18. Click the ***Next*** button. The Recovery Selection window appears.
19. Select the ***Entire Database*** radio button and click the ***Finish*** button. The Summary window appears.
20. Click the ***OK*** button. The Summary window closes, returning you to the Console.
21. In the Job pane, note the addition of a new row representing the recovery job.
22. The Status column value for the recovery job will change from submitted to scheduled to started. Finally the job will disappear from the Active tab and reappear on the History tab.
23. After the job disappears from the Active tab, click on the ***History*** tab.
24. Check the Status of the recovery job. If it shows Failed, then you can double click on the subject row to bring up the Edit Job window. Then double click on the Failed row to display the log of the recovery and determine the cause of the failure. You will need to fix the problem before proceeding.
25. If the Status of the recovery job shows Completed, then the database was successfully recovered.
26. In the Navigator pane, click the right mouse button on the C2SOC2 database. A pop-up menu appears.
27. Select ***Startup***. The Startup Options window appears.
28. Select the ***Open*** radio button in the Startup Mode group box and click the ***OK*** button. A progress indicator will appear briefly. Then a message box will appear stating: Oracle instance opened.
29. Application users can now access the database.
30. Return to Explorer and delete the files that were copied in step 9 of this procedure.

3.9.5.2 Disaster Recovery

Recovery of the database involves the following steps.

- Restore database backups to the d:\oracle\oradata\backup directory.
- Shutdown the database.
- Delete all files in the D:\Oracle\ORADATA\C2SOC2 directory on the database server.
- Start the database in No Mount mode.
- Recover the control files.
- Start the database in Mount mode.
- Recover the database. The recovery process will decompress the database files and put them back into the **d:\oracle\oradata\c2soc2** directory. The recovery process will also decompress archive log files and restore them to their original location.
- Open the database with the Resetlogs option.
- Reset the database in the Recovery catalog.
- Perform a full database backup.
- Save the latest backup to external media.

Setup

All setup should be done from the target server.

1. Use the procedures in Section 3.9.4.2 of this document to restore the latest backup files to the d:\oracle\oradata\backup directory.
2. Using Explorer, copy any "C2SOC2*.ARC" files from the d:\oracle\oradata\backup directory to the d:\oracle\oradata\c2soc2\archive directory on the database server.
3. Start a DOS session.
4. Type **`set oracle_sid=soc2`** and press the ***Enter*** key.
5. Type **`svrmgrl`** and press the ***Enter*** key. You will see an Oracle server manager prompt.
6. Type **`connect internal`** and press the ***Enter*** key. You will be prompted for a password.
7. Enter the appropriate password and press the ***Enter*** key.
8. Type **`Shutdown abort;`** and press the ***Enter*** key. This will shutdown the database.
9. Leave the DOS session open and using Explorer, navigate to the **d:\oracle\oradata\c2soc2** directory.
10. Move the files in this directory to another directory, in case the recovery process fails. There should be no files in this directory after the move operation is complete.
11. Using Explorer, navigate to the **d:\oracle\oradata\backup** directory.
12. Copy the c2soc2control.ctl file to the **d:\oracle\oradata\c2soc2** directory and rename it to control01.ctl.
13. Repeat the previous step, but rename this copy to control02.ctl.
14. Return to the DOS session and type **`Startup mount;`** and press the ***Enter*** key. This will place the database in mount mode, which is where the database needs to be for the recovery process.

15. Type **`select sequence#, thread# from v$log_history;`** and press the ***Enter*** key. A list of values will be displayed.
16. Record the values from the last row for SEQUENCE# and THREAD#.
17. Type **`exit`** and press the ***Enter*** key to exit server manager.
18. Type **`exit`** and press the ***Enter*** key to exit the DOS session.
19. Using Explorer navigate to the **d:\oracle\admin\c2soc2\recover** directory.
20. Open the **recover.rcv** file in Notepad.
21. Substitute the values determined in step# 17 above for the <sequence#> and <thread#> items in the file. After the line is edited, it should look similar to: set until logseq 1 thread 1;.
22. Save the file as **recover1.rcv** and close Notepad.

Recover Database Files

1. Using Explorer navigate to the **d:\oracle\admin\c2soc2\recover** directory.
2. Double click on the **restore.bat** file. A DOS session window will open and RMAN will prompt you for the password to the C2SOC2 database.
3. Enter the password for the CH2DBA user in the C2SOC2 database and press the ***Enter*** key. RMAN will prompt for the password to the catalog database.
4. Enter the password for the RMANCHART2 user in the Enterprise Manager database and press the ***Enter*** key. The RMAN script will restore the database files to the d:\oracle\oradata\c2soc2 directory. This will take approximately 5 minutes. The DOS session window will automatically close.
5. Using Explorer, double click on the **restore.log** file. It will open in Notepad.
6. Verify that no errors occurred. Close Notepad.
7. Using Explorer, double click on the **recover.bat** file. A DOS session window will open and RMAN will prompt you for the password to the C2SOC2 database.
8. Enter the password for the CH2DBA user in the C2SOC2 database and press the ***Enter*** key. RMAN will prompt for the password to the catalog database.
9. Enter the password for the RMANCHART2 user in the Enterprise Manager database and press the ***Enter*** key. The RMAN script will recover the database up to the last available log file as found in step# 16. Then it will open the database with the resetlog option set so that the missing online redo log files will be created. Finally, it will reset the database in the catalog database. The DOS session window closes automatically when the script is done.
10. Using Explorer, double click on the **recover1.log** file. It will open in notepad.
11. Verify the following line appears in the file:

    RMAN-08004: full resync complete
12. Close Notepad.

Backup the Database

1. Execute the steps in Section A.4.1.3 of this document to backup the database.

Post Recovery

The contents of the **d:\oracle\oradata\backup** directory should be backed up to external media.

3.9.6 Recovery Procedures for CHART II Interim Archive Database

The recovery procedures for an Oracle database are varied depending on the circumstances that required a recovery to be performed. The procedures provided below assume a full database recovery, whether all of the database files are lost or not. Two recovery scenarios are provided as follows:

Normal Recovery – Use this procedure if the database has crashed and will not start and the D: drive has not crashed. The database is in this state if you attempt to connect via SQL*Plus and get the Oracle Not Available error and attempting to start the OracleServiceC2ARCH2 service from Control Panel fails.

Disaster Recovery – Use this procedure if the D: drive containing the database fails and all database files are lost. **Disaster recovery can only recover data up to the last backup. Data entered since the last backup will be lost. This is due to the fact that all database files are on the D: drive. If the D: drive crashes then the only remaining media is the DLT tapes.**

3.9.6.1 Normal Recovery

Implement the following procedures if the database control files, online redo logs, and archived redo logs are available and not corrupt.

Recovery of the database involves the following steps.

- Shutdown the database.
- Delete the current datafiles.
- Restore database backups to the d:\oracle\oradata\backup directory.
- Recover the database. The recovery process will decompress the database files and put them back into the d:\oracle\oradata\c2arch2 directory. The recovery process will also decompress archive log files and restore them to their original location. Finally, the recovery process will apply changes to the database from the redo logs to recover changes made to the database since the last backup.

Detailed steps are as follows:

1. From the Enterprise Manager workstation, logon to the Enterprise Manager Console.
2. In the Navigator pane, double click on the Databases item to view the list of databases.
3. Click the right mouse button on the C2ARCH2 database. A pop-up menu appears.
4. Select ***Shutdown*** from the pop-up menu. The Shutdown Options window appears.
5. Select the ***Abort*** radio button and click the ***OK*** button. If you receive an "Oracle Not Available" error message, then the database is already shutdown. Leave Enterprise Manager open and proceed to the next step.
6. After the database is shutdown, use Explorer to connect to the target server's d:\oracle directory.

7. Navigate to the **d:\oracle\oradata\backup** directory and verify that the latest CHART II Interim Archive database backup files are in the directory. If they are not, use the procedures in Section 3.9.4.2 of this document to restore the latest files to this directory.
8. Navigate to the target server's **d:\oracle\oradata\c2arch2** directory.
9. Copy these files to another directory, in case the restore fails.
10. Delete the *.dbf files in the **d:\oracle\oradata\c2arch2** directory.
11. Return to the Enterprise Manager Console.
12. Right click on the C2ARCH2 database. A pop-up menu appears.
13. Select ***Startup***. The Startup Options window appears.
14. Select the ***Mount*** radio button in the Startup Mode group box and click the ***OK*** button. A progress indicator will appear briefly. Then a message box will appear stating: Oracle instance mounted.
15. Click the ***OK*** button to close the message box.
16. Click the right mouse button on the C2ARCH2 database. A pop-up menu appears.
17. Select ***Backup Management > Recovery*** from the pop-up menu. The Recovery Wizard Introduction window appears.
18. Click the ***Next*** button. The Recovery Selection window appears.
19. Select the ***Entire Database*** radio button and click the ***Finish*** button. The Summary window appears.
20. Click the ***OK*** button. The Summary window closes, returning you to the Console.
21. In the Job pane, note the addition of a new row representing the recovery job.
22. The Status column value for the recovery job will change from submitted to scheduled to started. Finally the job will disappear from the Active tab and reappear on the History tab.
23. After the job disappears from the Active tab, click on the ***History*** tab.
24. Check the Status of the recovery job. If it shows Failed, then you can double click on the subject row to bring up the Edit Job window. Then double click on the Failed row to display the log of the recovery and determine the cause of the failure. You will need to fix the problem before proceeding.
25. If the Status of the recovery job shows Completed, then the database was successfully recovered.
26. In the Navigator pane, click the right mouse button on the C2ARCH2 database. A pop-up menu appears.
27. Select ***Startup***. The Startup Options window appears.
28. Select the ***Open*** radio button in the Startup Mode group box and click the ***OK*** button. A progress indicator will appear briefly. Then a message box will appear stating: Oracle instance opened.
29. Application users can now access the database.
30. Return to Explorer and delete the files that were copied in Step 9 of this procedure.

3.9.6.2 Disaster Recovery

Recovery of the database involves the following steps.

- Restore database backups to the d:\oracle\oradata\backup directory.
- Shutdown the database.
- Delete all files in the D:\Oracle\ORADATA\C2ARCH2 directory on the database server.
- Start the database in No Mount mode.
- Recover the control files.
- Start the database in Mount mode.
- Recover the database. The recovery process will decompress the database files and put them back into the **d:\oracle\oradata\c2arch2** directory. The recovery process will also decompress archive log files and restore them to their original location.
- Open the database with the Resetlogs option.
- Reset the database in the Recovery catalog.
- Perform a full database backup.
- Save the latest backup to external media.

Setup

All setup should be done from the target server.

1. Use the procedures in Section 3.9.4.2 of this document to restore the latest backup files to the d:\oracle\oradata\backup directory.
2. Using Explorer, copy any "C2ARCH2*.ARC" files from the d:\oracle\oradata\backup directory to the d:\oracle\oradata\c2arch2\archive directory on the database server.
3. Start a DOS session.
4. Type **`set oracle_sid=c2arch2`** and press the ***Enter*** key.
5. Type **`svrmgrl`** and press the ***Enter*** key. You will see an Oracle server manager prompt.
6. Type **`connect internal`** and press the ***Enter*** key. You will be prompted for a password.
7. Enter the appropriate password and press the ***Enter*** key.
8. Type **`Shutdown abort;`** and press the ***Enter*** key. This will shutdown the database.
9. Leave the DOS session open and using Explorer, navigate to the **d:\oracle\oradata\c2arch2** directory.
10. Move the files in this directory to another directory, in case the recovery process fails. There should be no files in this directory after the move operation is complete.
11. Using Explorer, navigate to the **d:\oracle\oradata\backup** directory.
12. Copy the c2soc2control.ctl file to the **d:\oracle\oradata\c2arch2** directory and rename it to control01.ctl.
13. Repeat the previous step, but rename this copy to control02.ctl.
14. Return to the DOS session and type **`Startup mount;`** and press the ***Enter*** key. This will place the database in mount mode, which is where the database needs to be for the recovery process.

15. Type **`select sequence#, thread# from v$log_history;`** and press the ***Enter*** key. A list of values will be displayed.
16. Record the values from the last row for SEQUENCE# and THREAD#.
17. Type **`exit`** and press the ***Enter*** key to exit server manager.
18. Type **`exit`** and press the ***Enter*** key to exit the DOS session.
19. Using Explorer navigate to the **d:\oracle\admin\c2arch2\recover** directory.
20. Open the **recover.rcv** file in Notepad.
21. Substitute the values determined in step# 16 above for the <sequence#> and <thread#> items in the file. After the line is edited, it should look similar to: set until logseq 1 thread 1;.
22. Save the file as **recover1.rcv** and close Notepad.

Recover Database Files

1. Using Explorer navigate to the **d:\oracle\admin\c2arch2\recover** directory.
2. Double click on the restore.bat file. A DOS session window will open and RMAN will prompt you for the password to the C2ARCH2 database.
3. Enter the password for the CH2DBA user in the C2ARCH2 database and press the ***Enter*** key. RMAN will prompt for the password to the catalog database.
4. Enter the password for the RMANCHART2 user in the Enterprise Manager database and press the ***Enter*** key. The RMAN script will restore the database files to the d:\oracle\oradata\c2arch2 directory. This will take approximately 5 minutes. The DOS session window will automatically close.
5. Using Explorer, double click on the **restore.log** file. It will open in Notepad.
6. Verify that no errors occurred. Close Notepad.
7. Using Explorer, double click on the **recover.bat** file. A DOS session window will open and RMAN will prompt you for the password to the C2ARCH2 database.
8. Enter the password for the CH2DBA user in the C2ARCH2 database and press the ***Enter*** key. RMAN will prompt for the password to the catalog database.
9. Enter the password for the RMANCHART2 user in the Enterprise Manager database and press the ***Enter*** key. The RMAN script will recover the database up to the last available log file as found in step# 16. Then it will open the database with the resetlog option set so that the missing online redo log files will be created. Finally, it will reset the database in the catalog database. The DOS session window closes automatically when the script is done.
10. Using Explorer, double click on the **recover1.log** file. It will open in notepad.
11. Verify the following line appears in the file:
    RMAN-08004: full resync complete
12. Close Notepad.

Backup the Database

1. Execute the steps in Section A.4.2.3 of this document to backup the database.

Post Recovery

The contents of the **d:\oracle\oradata\backup** directory should be backed up to external media.

3.9.7 Recovery Procedures for OEM Database

This section contains two procedures for recovering a database. The Disaster Recovery procedures should be used when the hard disk that contains the database files crashes and all data is lost. Otherwise use the Normal Recovery procedures. Two recovery scenarios are provided as follows:

Normal Recovery – Use this procedure if the database has crashed and will not start and the D: drive has not crashed. The database is in this state if you attempt to connect via SQL*Plus and get the Oracle Not Available error and attempting to start the OracleServiceEMREP service from Control Panel fails.

Disaster Recovery – Use this procedure if the D: drive containing the database fails and all database files are lost. **Disaster recovery can only recover data up to the last backup. Data entered since the last backup will be lost. This is due to the fact that all database files are on the D: drive. If the D: drive crashes then the only remaining media is the network share that has the backup files.**

3.9.7.1 Normal Recovery

This procedure should be run when one or more database files become corrupt and the database cannot be opened.

1. From the Enterprise Manager workstation, start a DOS session.
2. Type **`set oracle_sid=emrep`** and press the ***Enter*** key.
3. Type **`svrmgrl`** and press the ***Enter*** key. You will see an Oracle server manager prompt.
4. Type **`connect internal`** and press the ***Enter*** key.
5. You will be prompted for a password. Enter the appropriate password and press the ***Enter*** key.
6. Type **`shutdown abort;`** and press the ***Enter*** key. This will shutdown the database.
7. Type **`startup mount;`** and press the ***Enter*** key. This will place the database in mount mode, which is where the database needs to be for the recovery process.
8. Type **`exit`** and press the ***Enter*** key to exit server manager.
9. Type **`exit`** and press the ***Enter*** key to exit the DOS session.
10. Using Explorer navigate to the **d:\oracle\oradata\emrep** directory.
11. Move the datafiles (*.dbf) to another location. Do not move the archive redo log files, the control files, or the online redo log files.
12. From Explorer, navigate to the **D:\Oracle\ORA81\Database\backup_recovery** directory.
13. Double click on the **recover_oem.bat** file. A DOS window will open and you will be prompted for a password.
14. Enter the password for the EMREP's SYS user and press the ***Enter*** key. You will be prompted for a second password.
15. Enter the password for the C2ARCH2'S RMANCHART2 user and press the ***Enter*** key. The recover script will run and the DOS window will close. The script will restore the database

from the last backup, then reapply the database changes up to the time of the database crash. Finally it will open the database for use by application users.

16. From Explorer double click on the **recover_oem.log** file to view it in Notepad. Verify that no errors occurred.
17. Close Notepad. If no errors occurred, delete the files that were moved in step 11.

3.9.7.2 Disaster Recovery

This procedure should be run when the drive that contains the database files crashes and the database files are lost.

Setup

1. Have the appropriate personnel restore the Enterprise Manager server's D: drive and the latest backup of the Enterprise Manager's database backup files.
2. Using Explorer, copy any "EMREP*.ARC" files from the d:\oracle\oradata\backup directory to the d:\oracle\oradata\emrep\archive directory.
3. Start a DOS session.
4. Type **`set oracle_sid=emrep`** and press the ***Enter*** key.
5. Type **`svrmgrl`** and press the ***Enter*** key. You will see an Oracle server manager prompt.
6. Type **`connect internal`** and press the ***Enter*** key.
7. You will be prompted for a password. Enter the appropriate password and press the ***Enter*** key.
8. Type **`shutdown abort;`** and press the ***Enter*** key. This will shutdown the database.
9. Leave the DOS session open and using Explorer navigate to the **d:\oracle\oradata\emrep** directory.
10. Move the files in this directory to another directory, in case the recovery process fails. There should be no files in this directory after the move operation is complete.
11. Using Explorer, navigate to the **d:\oracle\oradata\backup** directory .
12. Copy the emrepcontrol.ctl file to the **d:\oracle\oradata\emrep** directory and rename it to control01.ctl.
13. Repeat the previous step, but rename this copy to control02.ctl.
14. Return to the DOS session and type **`startup mount;`** and press the ***Enter*** key. This will place the database in mount mode, which is where the database needs to be for the recovery process.
15. Type **`select sequence#, thread# from v$log_history;`** and press the ***Enter*** key. A list of records will be displayed.
16. Look at the last row of the result list and record the values for the THREAD# and SEQUENCE#.
17. Type **`exit`** and press the ***Enter*** key to exit server manager.
18. Type **`exit`** and press the ***Enter*** key to exit the DOS session.
19. Using Explorer navigate to the **d:\oracle\ora81\database\backup_recovery** directory.
20. Open the **recover_oem_disaster.rcv** file in Notepad.
21. Substitute the values found in step#16 for the <sequence#> and <thread#> items in the file. After the line is edited, it should look similar to the following: set until logseq 1 thread 1;.

22. Save the file as **recover_oem_disaster1.rcv** and close Notepad.
23. Using Explorer, double click on the **restore_oem.bat** file. A DOS window will open and you will be prompted for a password.
24. Enter the password for the EMREP's SYS user and press the ***Enter*** key. You will be prompted for a second password.
25. Enter the password for the C2ARCH2's RMANCHART2 user and press the ***Enter*** key. The recover script will run and the DOS window will close. The script will restore the database files to the d:\oracle\oradata\emrep directory. This will take approximately 5 minutes.
26. From Explorer double click on the **restore_oem.log** file to view it in Notepad. Verify that no errors occurred.
27. Close Notepad.
28. Using Explorer, double click on the **recover_oem_disaster.bat** file. A DOS window will open and you will be prompted for a password.
29. Enter the password for the EMREP's SYS user and press the ***Enter*** key. You will be prompted for a second password.
30. Enter the password for the C2ARCH2's RMANCHART2 user and press the ***Enter*** key. The recover script will run and the DOS window will close. The script will recover the database up to the last available log file as found in step#16. Then it will open the database with the resetlog option set so that the missing online redo log files will be created.
31. From Explorer double click on the **recover_oem_disaster.log** file to view it in Notepad. Verify that no errors occurred.
32. Close Notepad.

Backup the Database

1. Execute the steps in the Immediate Backup Configuration subsection of Section A.4.3.2 of this document to backup the database.

Post Recovery

The contents of the **d:\oracle\oradata\backup** directory should be backed up to external media.

3.9.8 Recover Procedures to Different Database Server

In the event that the HANOVERCHART1 database crashes and become unavailable, the database can be recovered to the HANSOCCHART2 database server using the database backup from the DLT tapes. However, all data entered since the last backup will be lost.

The following procedures provide instructions for:

- restoring the database to the HANSOCCHART2 server and
- restoring the database back to the HANOVERCHART1 server after the server has been restored to operation.

3.9.8.1 Restore to HANSOCCHART2 server

HANSOCCHART2 Setup

1. Log into the HANSOCCHART2 server and perform the steps in Appendix A, Section A.2.2.
2. Open a DOS session.
3. Enter **`set oracle_sid=soc2`** and press the ***Enter*** key.
4. Enter the following on one line:
   `oradim -new -sid soc2 -intpwd <password> -startmode manual -pfile d:\Oracle\ADMIN\C2SOC2\pfile\initsoc2.ora`
   where <password> is the password for the internal user.
5. Press the ***Enter*** key. After a short pause, the command prompt will return. A service for the database has been created.
6. Type **`Exit`** and press the ***Enter*** key. The DOS window closes.
7. Select ***Services*** from Control Panel.
8. Select the ***OracleHomeAgent*** service.
9. Click the ***Stop*** button to stop the service.
10. Click the ***Start*** button to restart the service. Restarting this service will ensure that Oracle Enterprise Manager will see the new databases.

Recover Database

1. Have the network personnel move the DLT tape drive from the HANOVERCHART1 server to the HANSOCCHART2 server. In addition, the network personnel should install the necessary drivers so that the NT backup software can interface with the DLT tape unit.
2. Perform the procedures in Section 3.9.5.2 (Disaster Recovery) of this document, but do not backup the database. The database backup procedures will not work until the Oracle Enterprise Manager environment has been updated to point to the HANSOCCHART2 database.
3. Select ***Services*** from Control Panel.
4. Select the ***OracleServiceSoc2*** service.
5. Click the ***Startup*** button. The Service window appears.
6. Under Startup Type, click the ***Automatic*** radio button.
7. Click the ***OK*** button. The Service window closes.

8. Click the ***Start*** button to start the OracleServiceSoc2 service.
9. Close the Services window.
10. Close the Control Panel window.

Database Maintenance Setup

1. Log into the OEM console.
2. Look at the Active tab in the Job pane. Right click on each of the following jobs and select **Remove Job** from the popup menu.
   - C2SOC2_Backup
   - C2ARCH2_Backup
   - Export_SOC2
   - CHARTII DLT Tape Backup
   - Remove_R1B2_Aged_Backupsets
   - Remove_Aged_Logfiles
3. The jobs listed in step 2 will no longer be listed in the Active tab of the Job pane.
4. Look at the Registered tab in the Event pane. If the Event pane is not visible, select **Show Event Pane** from the View menu. Right click on each of the following events and select **Deregister** from the popup menu.
   - Monitor C2SOC2
   - Monitor C2ARCH2
   - Monitor C2ARCH2 Jobs
5. In about a minute, the events will disappear from the Event Pane.
6. Double click on the Databases item in the Navigator pane to expand the list of databases.
7. Right click on the **C2SOC2** database and select **Remove** from the popup menu.
8. Select ***Discover Nodes*** from the Navigator menu item. The Discover Nodes window appears.
9. Enter **`HANSOCCHART2`** in the text box and click on the ***OK*** button. A "Node already discovered" window appears.
10. Click the ***Yes*** button. The cursor changes to an hourglass. In a few seconds the "Node already appears" window will close and the status column in the "Status: Add Nodes" window will change to "Refreshed".
11. Click the ***Close*** button. The window closes returning you to the OEM console, where the C2SOC2 database will appear in the Navigator.
12. Select ***Preferences*** from the System menu. The "Edit Administrator preferences" property sheet appears.
13. Select the ***Preferred Credentials*** tab to view the services available for management.
14. Select the C2SOC2 database from the list.
15. Enter **`CH2DBA`** in the Username field and the appropriate password in the Password and Confirm Password fields. In the Role field, select ***SYSDBA*** from the drop down list. This will be the default user that Oracle Enterprise Manager uses to connect to the C2SOC2 database and to startup and shutdown the database.

16. Click the ***OK*** button to close the "Edit Administrator preferences" window.
17. Select **Job Library** from the Job menu. The Job Library window appears.
18. Select each of the following job names and click on the **Submit** button.
    - C2SOC2_Backup
    - Export_SOC2
19. Select each of the following job names and click on the **Edit** button. When the Edit Job window appears, remove the HANOVERCHART1 item from the Selected Destinations list and add the HANSOCCHART2 item to the Selected Destinations list. Finally, click the ***Submit*** radio button in the bottom left corner of the window and click the ***OK*** button to submit the Job.
    - CHARTII DLT Tape Backup
    - Remove_R1B2_Aged_Backupsets
    - Remove_Aged_Logfiles
20. Click the ***Close*** button to close the Job Library window.
21. Select **Event Library** from the Event menu. The Event Library window appears.
22. Select the Monitor C2SOC2 item from the Event list and click the ***Register*** button.
23. Click the ***Close*** button to close the Event library window.

3.9.8.2 Restore Database to HANOVERCHART1 server

Shutdown HANSOCCHART2 Database

1. Log into the HANSOCCHART2 server.
2. Open a DOS session.
3. Type **`set oracle_sid=soc2`** and press the ***Enter*** key.
4. Type **svrmgrl** and press the ***Enter*** key. You will see an Oracle server manager prompt.
5. Type **`connect internal`** and press the ***Enter*** key. You will be prompted for a password.
6. Enter the appropriate password and press the ***Enter*** key.
7. Type **`Shutdown immediate;`** and press the ***Enter*** key. This will shut down the database.
8. Type **`Exit`** and press the ***Enter*** key to exit server manager.
9. Type **`Exit`** and press the ***Enter*** key to close the DOS session.
11. Select the ***OracleServiceSoc2*** service.
12. Click the ***Startup*** button. The Service window appears.
13. Under Startup Type, click the ***Manual*** radio button.
14. Click the ***OK*** button. The Service window closes.
15. Click the ***Stop*** button to stop the OracleServiceSoc2 service.
16. Close the Services window.
17. Close the Control Panel window.
18. Log out of the HANSOCCHART2 server.

DLT Tape Drive

Move the DLT tape drive from the HANSOCCHART2 server to the HANOVERCHART1 server.

Restore HANOVERCHART1 Database

1. Log into the HANOVERCHART1 server.
2. Open a DOS session.
3. Type **`set oracle_sid=soc2`** and press the ***Enter*** key.
4. Type **svrmgrl** and press the ***Enter*** key. You will see an Oracle server manager prompt.
5. Type **`connect internal`** and press the ***Enter*** key. You will be prompted for a password.
6. Enter the appropriate password and press the ***Enter*** key.
7. Type **`Shutdown abort;`** and press the ***Enter*** key. This will shut down the database.
8. Leave the DOS session open.
9. Using Explorer, navigate to the d:\oracle\oradata\c2soc2 directory and delete all files and folders.
10. Using Explorer, navigate to the HANSOCCHART2 server's d:\oracle\oradata\c2soc2 directory and copy all files and folders to the local version of this directory.
11. Return to the DOS session and type **`startup`** and press the ***Enter*** key. This will start up the database locally.
12. Select ***Services*** from Control Panel.
13. Select the ***OracleHomeAgent*** service.
14. Click the ***Stop*** button to stop the service.
15. Click the ***Start*** button to restart the service. Restarting this service will ensure that Oracle Enterprise Manager will see the new databases.

Oracle Enterprise Manager Setup

1. Log into the OEM console.
2. Look at the Active tab in the Job pane. Right click on each of the following jobs and select **Remove Job** from the popup menu.
   - C2SOC2_Backup
   - C2ARCH2_Backup
   - Export_SOC2
   - CHARTII DLT Tape Backup
   - Remove_R1B2_Aged_Backupsets
   - Remove_Aged_Logfiles
3. Look at the Registered tab in the Event pane. If the Event pane is not visible, select **Show Event Pane** from the View menu. Right click on each of the following events and select **Deregister** from the popup menu.
   - Monitor C2SOC2
   - Monitor C2ARCH2
   - Monitor C2ARCH2 Jobs
4. In about a minute, the events will disappear from the Event Pane.

5. Double click on the Databases item in the Navigator pane to expand the list of databases.
6. Right click on the **C2SOC2** database and select **Remove** from the popup menu.
7. Select ***Discover Nodes*** from the Navigator menu item. The Discover Nodes window appears.
8. Enter **`HANOVERCHART1`** in the text box and click on the ***OK*** button. A "Node already discovered" window appears.
9. Click the ***Yes*** button. The cursor changes to an hourglass. In a few seconds the "Node already appears" window will close and the status column in the "Status: Add Nodes" window will change to "Refreshed".
10. Click the ***Close*** button. The window closes returning you to the OEM console, where the C2SOC2 database will appear in the Navigator.
11. Select ***Preferences*** from the System menu. The "Edit Administrator preferences" property sheet appears.
12. Select the ***Preferred Credentials*** tab to view the services available for management.
13. Select the C2SOC2 database from the list.
14. Enter **`CH2DBA`** in the Username field and the appropriate password in the Password and Confirm Password fields. In the Role field, select ***SYSDBA*** from the drop down list. This will be the default user that Oracle Enterprise Manager uses to connect to the C2SOC2 database and to startup and shutdown the database.
15. Click the ***OK*** button to close the "Edit Administrator preferences" window.
16. Select **Job Library** from the Job menu. The Job Library window appears.
17. Select each of the following job names and click on the **Submit** button.
    - C2SOC2_Backup
    - Export_SOC2
    - CHARTII DLT Tape Backup
    - Remove_R1B2_Aged_Backupsets
    - Remove_Aged_Logfiles
18. Click the ***Close*** button to close the Job Library window.
19. Select **Event Library** from the Event menu. The Event Library window appears.
20. Select each of the following items from the Event list and click the ***Register*** button.
    - Monitor C2SOC2
    - Monitor C2ARCH2
    - Monitor C2ARCH2 Jobs
21. Click the ***Close*** button to close the Event Library window.
22. Close the Oracle Enterprise Manager Console.

3.9.9 Designer Database Objects

The Oracle Designer 6.0 data model tool contains the database objects for the CHART II system. This tool provides the Entity Relationship Diagram (ERD), physical database design and data dictionary for both the operational and interim archive schemas.

The database objects are accessible via the tool by entering the application system when prompted. The application system will consist of the name "CHART2-<release_name>". The release name will be the name of the current release being implemented such as "CHART2-R1B2A". Previous releases will be contained in the application system list. Entering this information will allow the Designer 6.0 Front Panel to appear. From this panel the DBA can select a variety of modeling tools and utilities.

The main access to the physical database objects is through the Repository Object Navigator (RON). The RON allows the DBA to see all the objects in the tool. The physical objects are listed under the Server Model Definitions directory. The DBA can find the detailed information regarding each table in this directory. Under the Database & Network Design directory, the DBA will find the information for each database by database name, including the users, roles and storage allocation.

The physical database objects are used to generate the Oracle scripts that create the actual database. These scripts are put into configuration management in ClearCase under the directory path <drive>:\CHARTII_DB_SOC\oracle\admin\<database name>\create\Designer.

3.9.9.1 Storage Allocation

The basic storage allocation per database is divided into four major tablespaces; two for data and two for indexes. There is one tablespace for dynamic data and one for static data; the index tablespaces are also broken into dynamic and static.

Each tablespace name is prefaced with "CHART2" for the operational database and "C2ARCH2" for the interim archive; for example, CHART2_DATA and CHART2_STATIC_DATA. The complete information on these tablespaces can be found in the Designer 6.0 tool in the RON.

Each tablespace lists the datafile name(s) where the data is stored. These datafiles correlate to the names found in the Enterprise Manager tool where the datafiles are maintained operationally. The scripts for creating the datafiles use autoextend capability. The CHART2 databases implement a new feature in Oracle8i called locally managed tablespaces. This means that the extent size for each tablespace is fixed, except for the System tablespace which cannot be locally managed. The extent sizes are listed below in Tables 3–10 and 3–11. Some of the advantages of locally managed tablespaces are no fragmentation and the ability to handle substantially more extents than previous versions of Oracle with minimal to no performance hit.

Table 3–10. C2SOC2 Tablespaces

C2SOC2 Tablespace	Purpose	Extent Size
CHART2_DATA	Table 3-2 data	128KB
CHART2_INDEX	Table 3-2 indexes	32KB
CHART2_LOB_DATA	HAR voice data	1MB
CHART2_STATIC_DATA	Table 3-1 data	64KB
CHART2_STATIC_INDEX	Table 3-1 indexes	32KB
INDX	Default index tablespace	32KB
RBS	Standard Rollback	128KB
RBSBIG	Archiving/Migration Rollback	1MB
SYSTEM	Dictionary	N/A
TEMP	Sort space	128KB
USERS	Default data tablespace	64KB

Table 3–11. C2ARCH2 Tablespaces

C2ARCH2 Tablespace	Purpose	Extent Size
C2ARCH2_DATA	Event and Log data	4MB
C2ARCH2_INDEX	Event and Log indexes	512 KB
C2ARCH2_STATIC_DATA	Code table data	128KB
C2ARCH2_STATIC_INDEX	Code table indexes	32KB
INDX	Default index tablespace	32KB
RBS	Standard Rollback	128KB
RBSBIG	Archiving/Migration Rollback	1MB
RCVCAT	RMAN Repository	128KB
SYSTEM	Dictionary	N/A
TEMP	Sort space	4MB
USERS	Default data tablespace	128KB

3.9.9.2 CHART II R1B2A Overview

The R1B2A schema consists of the 47 tables listed below in Table 3–12, R1B2A Static Tables and Table 3–13, R1B2A Dynamic Tables. The static tables contain the administrative data that are needed to set up the operational system. These data change infrequently. The volume estimates are based on the complete number of rows per entity required to store the CHART II administrative data for the entire system. These data are pre-loaded.

Table 3–12. R1B2A Static Tables

No.	Table Name	Max Rows
1	CENTER	500
2	CH2_DICTIONARY	5
3	CODE_LIST	30
4	CODE_LIST_ITEM	450
5	DEVICE_CONFIGURATION	100
6	DICTIONARY_WORD	10,000
7	DMS	100
8	DMS_FONT	100
9	DMS_PHONE_NUMBER	500
10	EQUIPMENT	500
11	FUNCTIONAL_RIGHT	200
12	MESSAGE_LIBRARY	500
13	ORGANIZATION	200
14	PLAN	2,000
15	PLAN_ITEM	10,000
16	PROFILE_PROPERTY	12,000
17	RESOURCE_CATEGORY_TYPE	10
18	RESOURCE_TYPE	100
19	ROLE	100
20	ROLE_ASSIGNMENT	2,000
21	ROLE_FUNCTION	400
22	STANDARD_LANE	400
23	STANDARD_LANE_CONFIG	100
24	STORED_MESSAGE	10,000
25	SYSTEM_PROFILE	100
26	TSS	
27	TSS_PHONE_NUMBER	
28	TSS_ZONE_GROUP	
29	TSS_ZONE	
30	USER ID	1,500

The R1B2A dynamic tables consist of data that grow based on operational functions. The tables contain event data, operations and communications log data and communications failure log data. Excluding the event data, the log data are stored for a user-specified period of time, currently for a two-week period of operation, and then deleted from the operational system. The event data are stored during the time that the event is open plus a user-specified period of time after the event is closed. The user-specified period of time is the same time span as the log data. Event data are deleted from the operational database two weeks after an event is closed. The event and log data are migrated to the Interim Archive daily.

Table 3–13. R1B2A Dynamic Tables

No.	Table Name	Max Rows
1	ACTION	400
2	ASSOCIATED_EVENT	200
3	CENTER_LOGIN	1,500
4	COMMUNICATIONS_FAILURE_LOG	2,000
5	COMMUNICATIONS_LOG	2,000
6	DISABLED_VEHICLE_INDICATOR	1,500
7	DMS_STATUS	100
8	EVENT	1,000
9	EVENT_HISTORY	60,000
10	EVENT_RESOURCE	4,000
11	INCIDENT	1,000
12	INCIDENT_VEHICLES_INVOLVED	660
13	LANE_STATE	4,000
14	OPERATIONS_LOG	5,600
15	RESPONSE_PLAN_ITEM	5,000
16	TSS_STATUS	
17	WEATHER	2,000

3.9.9.3 CHART II Interim Archive Overview

The purpose of the Interim Archive database is to store the event history and log data generated by the CHART II SOC operational database. The Interim Archive schema consists of the tables listed in Table 3–14, Interim Archive. At this point in time, the tables are pulled as is from the operational database without manipulating the data.

Since the full requirements of the archive are not known at this point and the complete content is not available, we are calling this storage an Interim Archive. It is the basic ingredients of the information CHART II will have for eventually building the CHART II Archive.

Table 3–14. Interim Archive

No.	Table Name	Max Rows
1	ACTION	10,400
2	ASSOCIATED_EVENT	5,200
3	CODE_LIST	30
4	CODE_LIST_ITEM	450
5	COMMUNICATIONS_FAILURE_LOG	52,000
6	COMMUNICATIONS_LOG	52,000
7	DEVICE	1000
8	DISABLED_VEHICLE_INDICATOR	39,000
9	EVENT	26,000
10	EVENT_HISTORY	1,560,000
11	EVENT_RESOURCE	104,000
12	INCIDENT	26,000

No.	Table Name	Max Rows
13	INCIDENT_VEHICLES_INVOLVED	17,160
14	LANE_STATE	104,000
15	OPERATIONS_LOG	145,600
16	RESOURCE_CATEGORY_TYPE	10
17	RESOURCE_TYPE	100
18	WEATHER	52,000

3.9.9.4 CHART II Data Dictionary Report Tools

The Designer 6.0 tool also contains reporting capability in the Repository Reports. These reports provide information on the data dictionary objects contained under the directory Server Model Definitions. Most useful is the Table Definition report that provides detailed information on the tables in the physical database including the column data type, size and definition.

The Database and Network Design directory provides reports on database sizing. The Database Table and Index Size Estimate report provides the size of the database either for the database only; the database, tables and keys; or the database, tables, keys and columns.

The maximum size of the database storage for the R1B2A operational data for a two-week period, based on a block size of 4KB, is:

- Tables - 315MB
- Indexes - 24MB

The maximum size of the database storage for the Interim Archive database for one year, based on a block size of 16KB, is:

- Tables - 5.3 GB
- Indexes - 476 MB

The maximum size is based on the volume shown in Tables 3–12, 3–13 and 3–14 with the assumption that every row will be populated for the period of time estimated. Actual size may be less than estimated depending on the actual number of events and log entries that occur during that period.

3.9.9.5 Security Overview

The database security for CHART II consists of assigning privileges to the CHART II users at the application server level. Roles are assigned per application server. These roles are given privileges on specific tables based on what the application server requires to perform its functions. Database security does not monitor the individual user level. The database server assumes that if access is granted to the user then the appropriate security check was performed prior to the user gaining access to the database.

Table 3–15, Database User/Role Matrix shows the users by application that can access the CHART II R1B2A database and the roles assigned to those users.

Table 3–15. Database User/Role Matrix

User	Role
ARCHIVE_USER	CHART2_ARCHIVE_ROLE
DMSSERVICE	CHART2_DICTIONARY_ROLE CHART2_DMS_CTRL_ROLE
MESSAGEUTILITYSERVICE	CHART2_DICTIONARY_ROLE CHART2_MSG_LIB_ROLE CHART2_PLAN_ROLE
REPORT	CHART2_REPORT_ROLE
TRAFFICEVENTSERVICE	CHART2_COMM_LOG_ROLE CHART2_TRAFFIC_EVENT_ROLE
TSSSERVICE	CHART2_TSS_CTRL_ROLE
USERMANAGEMENTSERVICE	CHART2_RESOURCE_ROLE CHART2_USER_MGMT_ROLE

Table 3–16, Database Role/Table/Privilege Matrix shows the tables that are accessible to a role and the specific privilege granted to that role for a given table.

Table 3–16. Database Role/Table/Privilege Matrix

Role	Table	Privilege			
		Select	Insert	Update	Delete
CHART2_ARCHIVE_ROLE	Reference Tables 3-13 and 3-14	X			X
CHART2_COMM_LOG_ROLE	CODE_LIST	X			
	CODE_LIST_ITEM	X			
	COMMUNICATIONS_LOG	X	X	X	
	OPERATIONS_LOG		X		
CHART2_DICTIONARY_ROLE	CH2_DICTIONARY	X			
	CODE_LIST	X			
	CODE_LIST_ITEM	X			
	DICTIONARY_WORD	X	X	X	X
	OPERATIONS_LOG	X			
CHART2_DMS_CTRL_ROLE	CODE_LIST	X			
	CODE_LIST_ITEM	X			
	COMMUNICATIONS_FAILURE_LOG		X		
	DEVICE_CONFIGURATION	X	X	X	X
	DMS	X	X	X	X

Role	Table	Privilege			
		Select	Insert	Update	Delete
	DMS_FONT	X	X		
	DMS_PHONE_NUMBER	X	X	X	X
	DMS_STATUS	X	X	X	X
	OPERATIONS_LOG		X		
	RESPONSE_PLAN_ITEM	X	X	X	X
CHART2_MSG_LIB_ROLE	CODE_LIST	X			
	CODE_LIST_ITEM	X			
	MESSAGE_LIBRARY	X	X	X	X
	OPERATIONS_LOG		X		
	STORED_MESSAGE	X	X	X	X
CHART2_PLAN_ROLE	CODE_LIST	X			
	CODE_LIST_ITEM	X			
	OPERATIONS_LOG		X		
	PLAN	X	X	X	X
	PLAN_ITEM	X	X	X	X
CHART2_REPORT_ROLE	Reference Tables 3-13 and 3-14	X			
CHART2_RESOURCE_ROLE	CENTER	X			
	CODE_LIST	X	X		
	CODE_LIST_ITEM	X	X		
	OPERATIONS_LOG		X		
	ORGANIZATION	X			
CHART2_TRAFFIC_EVENT_ROLE	ACTION	X	X		X
	ASSOCIATED_EVENT	X	X		X
	CODE_LIST	X			
	CODE_LIST_ITEM	X			
	DISABLED_VEHICLE_INDICATOR	X	X		X
	EVENT	X	X	X	
	EVENT_HISTORY	X	X	X	
	EVENT_RESOURCE	X	X	X	X
	INCIDENT	X	X		
	INCIDENT_VEHICLES_INVOLVED	X	X	X	X
	LANE_STATE	X	X	X	
	OPERATIONS_LOG		X		
	RESPONSE_PLAN_ITEM	X	X	X	X
	STANDARD_LANE	X	X	X	X
	STANDARD_LANE_CONFIG	X	X	X	X
	SYSTEM_PROFILE	X	X		
	WEATHER	X	X		X

Role	Table	Privilege			
		Select	Insert	Update	Delete
CHART2_TSS_CTRL_ROLE	CODE_LIST	X			
	CODE_LIST_ITEM	X			
	COMMUNICATIONS_FAILURE_LOG		X		
	OPERATIONS_LOG		X		
	TSS	X	X	X	X
	TSS_PHONE_NUMBER	X	X	X	X
	TSS_STATUS	X	X	X	X
	TSS_ZONE_GROUP	X	X	X	X
	TSS_ZONE	X	X	X	X
CHART2_USER_MGMT_ROLE	CENTER_LOGIN	X	X		X
	CODE_LIST	X			
	CODE_LIST_ITEM	X			
	EQUIPMENT	X	X		X
	FUNCTIONAL_RIGHT	X			
	OPERATIONS_LOG		X		
	ORGANIZATION	X			
	PROFILE_PROPERTY	X	X	X	X
	RESOURCE_CATEGORY_TYPE	X			
	RESOURCE_TYPE	X	X		
	ROLE	X	X		X
	ROLE_ASSIGNMENT	X	X		X
	ROLE_FUNCTION	X	X		X
	SYSTEM_PROFILE	X	X	X	X
	USER_ID	X	X	X	X

3.10 Special Operating Instructions

This section contains special instructions on responding to certain problems and conditions that may arise in the CHART II system.

3.10.1 Special Instructions

This section contains instructions for responding to error conditions that the user may expect to encounter through normal usage of the system and instructions for handling special conditions that may arise during operations.

3.10.1.1 Deleting a device

If a field device must be deleted from the CHART II system the device must first be placed in an off-line state. In general, deleting a device from the system should be avoided unless the device is physically being removed. If a device is being replaced with a different model the existing device entry can simply be modified to reflect the new device characteristics.

Deleting a DMS that is used in a plan will cause the corresponding plan item to become invalid. The plan item will display in the plan with the device indicated as *unknown*. The invalid plan item will be ignored if the plan is used as part of a response plan for an event.

3.10.1.2 Polling Interval

Though the software permits the polling interval to be set as low as one minute, R1B2A is being provided with a recommended polling interval setting of no shorter than 2 minutes for DMS devices. Using an interval of less than this value may result in contention for communications ports.

For RTMS devices the polling interval should not be set to a value less than the message period of the RTMS device. Polling an RTMS more frequently than its message period may result in no data being returned from the device which causes the device to be flagged as comm failed.

3.10.1.3 Event Service Failure

If the Event service should fail or stop working the CHART II GUIs will no longer update. When the Event service is restarted the GUIs will begin updating within about 15 seconds. The GUIs will receive and display any new changes, however updates that occurred while the Event service was down (e.g. a new comm log entry) will not be displayed unless the GUI is restarted.

3.10.1.4 CHART CHAT

When a user launches the CHART CHAT application it should automatically pick up the username for the user. If this does not occur then verify that the ChartChat.ini file on the CHART CHAT server has the GIVEN_NAME parameter set to ON.

3.10.2 Known Problems

Special operating instructions are provided to document recovery procedures or workarounds for known problems that exist in a release of the CHART II system. These instructions are documented in Attachment J of the SCN. Additional known problems are documented in Attachment F of the SCN. Other system limitations are addressed in Attachment H of the SCN, while “External Issues and Assumptions” are in Attachment M. Appendix B of this document provides a more user friendly version of SCN Attachment J for those problems likely to be encountered during the operation of the system.

4 Problem Identification and Resolution

4.1 Problem Identification

The CHART II system provides several mechanisms for reporting system status and error information. The CHART II GUI provides a command status window and a command failure window for informing the user of the result of an action. These messages are also recorded in the Operations Log. The status of actions performed in an open Event are recorded and displayed in the Event History. Messages that are displayed to the user and which may require some user action are listed in Appendix E.

In addition to those messages displayed to the user and logged in the Operations Log and Event History the CHART applications will log information to application specific log files (see Section 3.7). The CHART applications can be configured to record detailed debug information useful for trouble-shooting problems. See Section 3.8.2 for instructions on modifying application property file parameters.

4.1.1 Communications Problems

Communications problems with devices will be recorded in the PortManager log for the FMS PortManager that serves the device in question. If a communications problem is suspected then the PortManager should be set to debug mode (see Section 3.8.2) to record as much information on communicating with devices as possible. If this fails to identify the problem then addition information may be obtained through device specific information (see below).

4.1.2 Device Problems

The information available for aiding in the investigation of problems with devices is device type and model specific.

4.1.2.1 DMS Devices

The DMS Status logs (see Section ??) and the Device logs (see Section ??) provide detailed information on the status of a DMS and on the commands being sent from the CHART II system to the device. For DMS devices where communications are established additional device information can be obtained through the device Properties display. Properties tabs for Extended Status, Lamp Status, and Pixel Status are available for certain DMS types as shown in the list below.

Extended Status	FP9500, PCMS, Sylvia, TS3001
Lamp Status	FP9500, Sylvia, TS3001
Pixel Status	FP9500, TS3001

To obtain the extended status for a DMS perform the following steps:

1. Put the DMS in maintenance mode.

2. Right click on the device and select Get Extended Status
3. Wait for communications with the sign to complete then select Properties for the device.
4. Select the Extended Status tab.

To obtain the pixel status for a DMS perform the following steps:

1. Put the DMS in maintenance mode.
2. Right click on the device and select Pixel Test (this can also be performed from the Pixel Status tab in the Properties display).
3. Right click on the device and select Get Extended Status
4. Wait for communications with the sign to complete then select Properties for the device.
5. Select the Pixel Status tab.

4.2 Maintenance Overview

All CHART II system maintenance functions are provided by the CSC/PBFI team. CHART II software, communications and hardware problems (excluding problems with the actual field devices) are reported to the Help Desk (410-691-6600 or 888-301-7272).

4.3 Maintenance Documentation

The following documents are available as supporting information.

CHART II R1B2A Users Guide, M361-UG-001R0

CHART II Operations and Maintenance Guide Release 1 Build 2A, M363-UG-003R0

Acronym List

AOC	Authority Operations Center
CORBA	Common Object Request Broker Architecture
DMS	Dynamic Message Sign
FMS	Field Management Station
JRE	Java Runtime Environment
MDSHA	Maryland State Highway Administration
NOC	Network Operations Center
OMG	Object Management Group
ORB	Object Request Broker
SCN	Software Change Notice
SOC	State Operations Center
TOC	Traffic Operations Center

Appendix A – System Installation Instructions

This appendix provided step by step instructions for the installation and configuration of the CHART II system. Section A.1 describes the CHART II system applications procedures and Section A.2 describes the Oracle 8i installation procedure.

A.1 CHART II System Installation

The standard CHART II system installation media is a CD-ROM containing the CHART II server and support applications and the required version of the Java Runtime Environment. The installation procedure may be run directly from the CD-ROM or the installation directories may be copied from the CD-ROM to a local or networked disk and installed from there.

A.1.1 System Installation Requirements

CHART II R1B2A is designed to operate across a Windows NT network. The system requirements for each type of installation are listed below.

CHART Client Installation:

- Windows NT 4.0 Service Pack 5 (with TCP/IP networking installed)
- Sun Java Runtime Environment (JRE) version 1.3 (for windows)
- A valid operations center name is required for the CHART client software installation. The valid values for operations center in the R1B2A system are listed below.

AOC
DMSMAINTENANCE
MCTMC
NOC
RAVENSTOC
REDSKINSTOC
SIGNAL
SOC
TOC3
TOC4
TOC5

CHART Server Installation:

- Windows NT 4.0 Service Pack 5 (with TCP/IP networking installed)
- Sun Java Runtime Environment (JRE) version 1.3 (for Windows)
- Oracle version 8I and CHARTII Database (See Section A.2)

FMS Server Installation:

- Windows NT 4.0 Service Pack 5 (with TCP/IP networking installed)
- Sun Java Runtime Environment (JRE) version 1.3 (for Windows)

Installation Note:

If Oracle8i is installed after the CHART II GUI, the CHART II GUI will no longer work. This is due to the fact that the Oracle installation changes the Java Runtime Environment registry value. To fix this perform the following:

1. Run the registry editor (regedt32.exe)
2. Navigate to the following registry key: HKEY_LOCAL_MACHINE\SOFTWARE\JavaSoft\Java Runtime Environment.
3. Change the "CurrentVersion" registry value to "1.3".

A.1.2 Installation Instructions for CHART Client Workstation

This section describes the procedure for installing the CHART II GUI on a client workstation.

1. Prior to installation, ensure you have the following information:
   - The name of the operations center that is to be assigned to the target workstation. This is case sensitive and must be specified exactly as it exists within the CHART II system.
   - The host name of the computer that is running the Trading Service and the port number used by the Trading Service. This service is likely to be installed on the same machine as the other CHART II servers. If the Trading Service was installed using the default set-up values, the default port number presented in the client installation program can be used.
2. Uninstall any previous versions of the CHART II client software or the JRE (Note: if you are uninstalling CHART II servers on this system, go to Section 2.3.2). To uninstall this software do the following:
   a. Log into the target machine and select Settings>Control Panel from the Start menu.
   b. Double-click on Add/Remove Programs
   c. Select Chart II or a previous version of the Java Runtime Environment.
   d. Click the Add/Remove button and follow the instructions.
   e. Part of the directory structure and some files may remain after running this step. These files can include property files, log files and other temporary files used by CHART. To remove these files, go to the installation directory and delete the Chart II directory and all of its contents.
3. Log into the target machine and insert the CHART II installation CD in the CD ROM drive.
4. If JRE 1.3 is not already installed on the target machine, run the j2re1_3_0-win.exe program (contained on the CHART II CD) and follow the on-screen instructions to install it. You need not restart the computer at this time.
5. Start the CHART II installation by running setup.exe from the CHART II installation CD.
6. Complete the installation by following the on-screen instructions as follows:

a. Read the information on the Welcome screen and press the Next button to continue.

b. Read the Information window and press the Next button to continue.

c. Choose a folder where CHART II will be installed. It is recommended that the default directory on the D: drive (if available) be used for all workstations to provide a common configuration across all workstations. Press the Next button to continue.

d. On the Select Components window, uncheck all components except for "Client Software (GUI)". Make sure to scroll down and uncheck the remaining services. Press the Next button to continue.

e. On the Select Program Folder window, enter a folder name (or accept the default) and press the Next button to continue. The data files will be copied from the installation media to the target system.

f. On the General Settings window, enter the operations center name to assign to the workstation. As described above, this value is case sensitive and must exist within the CHART II system. Enter the number of days to keep log files (used to aid in service instances) or accept the default. Press the Next button to continue.

g. On the Required Services Locations window, enter the host name of the machine where the Trading Service is running. Enter the port number used by the Trading Service if a non-standard port was used during the Server Installation. In the ChartChat client box, enter the IP address of the machine on which the ChartChat service is running. Press the Finish button to finish the custom settings.

h. When the Setup Complete window appears, click on its finish button to complete the installation.

i. It is not necessary to reboot the computer for the client only installation.

j. The installation installs a shortcut on the desktop for CHART II. Double-click the icon and log into CHART II to verify the installation.

7. Post installation step to prevent multiple copies of the CHART GUI from being started on a single workstation.

   a. Edit the Chart2GUI.props file in the installation folder.

   b. Scroll to the bottom of the file and add the following lines:

      # The line below prevents multiple copies of the GUI from starting

      ooc.orb.oa.port=9007

   c. Save the changes and exit.

A.1.3 Installation Instructions for CHART Servers

This section describes the procedure for installing the CHART II services on a CHART II server.

1. Prior to installation, ensure you have the following information:

   - The name of the operations center that is to be assigned to the server. This is case sensitive and must be specified exactly as it exists within the CHART II system.
   - The host name of the computer that is running the Oracle database, the name of the database instance, and the port number being used by the database instance.
   - Database user names and passwords for the CHART II User Management Service, the DMS Service, the Plan Service, and the Traffic Event Service.

   The form included in Appendix B may be used to record this information so that it is readily available when required during the installation.

2. Shutdown all CHART clients connected to this server.
3. Uninstall any previous versions of the CHART II software or the JRE. To uninstall this software do the following:

   a. Log into the target machine with administrator privileges.
   b. Select Settings>Control Panel from the Start menu.
   c. Double-click on Services
   d. Stop all Chart2 services, then close the Services application
   e. Go to the bin folder of the CHART II installation directory
   f. Remove the services from the Registry. Under each of the services folders is a file called *<serviceName>RemoveService.cmd.* Executing these files will remove the services from the Registry.
   g. Select Settings>Control Panel from the Start menu.
   h. Double-click on Add/Remove Programs
   i. Select Chart II from the list.
   j. Click the Add/Remove button and follow the instructions.
   d. Part of the directory structure and some files may remain after running this step. These files can include property files, log files and other temporary files used by CHART. To remove these files, go to the installation directory and delete the Chart II directory and all of its contents.
   k. If required, also remove the Java Runtime Environment

4. Log into the target machine with administrator privileges and insert the CHART II installation CD in the CD ROM drive.
5. If JRE 1.3 is not already installed on the target machine, run the j2re1_3_0-win.exe program (contained on the CHART II CD) and follow the on-screen instructions to install it. You need not restart the computer at this time.
6. Start the CHART II installation by running setup.exe from the CHART II installation CD.

7. Complete the installation by following the on-screen instructions as follows:
    a. Read the information on the Welcome screen and press the Next button to continue.
    b. Read the Information window and press the Next button to continue.
    c. Choose a folder where CHART II will be installed. It is recommended that the default directory on the D: drive (if available) be used for all servers to provide a common configuration across all servers. Press the Next button to continue.
    d. On the Select Components window make sure all components are selected except for the Comm Service. Press the Next button to continue.
    e. On the Select Program Folder window, enter a folder name (or accept the default) and press the Next button to continue. The data files will be copied from the installation media to the target system.
    f. On the TCP Port Assignments window, change the port numbers if necessary. The default values are usually OK unless some other application is already using one or more of these values.
    g. On the General Settings window, enter the name of the site where you are installing the servers. This name defaults to the host name, but can be any descriptive name for the site, such as "SOC Server Room". Also enter the operations center name to assign to the GUI that is installed on the server. As described above, this value is case sensitive and must exist within the CHART II system. Lastly, enter the number of days to keep log files (used to aid in service instances) or accept the default. Press the Next button to continue.
    h. On the Database Settings window, modify the database connection string if necessary. The connection string contains the host name of the database server (after the @), the port used by the database server, and the instance name of the database, separated by colons. For example the connection string "jdbc:oracle:thin:@chart2-svr3:1521:SOC" specifies that the database server is running on the machine with host name "chart2-svr3" on port 1521 and the database instance name is "SOC".

        Note - the instance name you enter is case sensitive – using the incorrect case will inhibit the ability to run the server applications as NT Services. The instance name can be checked by opening the NT Service Control Manager dialog on the database server and viewing the service name that starts with "OracleService". The database instance name (in its case sensitive form) is appended to this service name, e.g. OracleServiceSOC.

        Also enter the user names and passwords to be used by the CHART II services for their database usage. The default user names should exist on any CHART II database installation; however the passwords may need to be obtained from the database administrator.
    i. On the Required Services Locations window check the Trading Service and Event Service information. Access to a Trading Service and an Event Service are required. If you did not choose to install a Trading Service or Event Service during your installation, you must enter the host name and port for the service(s) that will be used. Press the Finish button to finish the customized settings.

j. When the Setup Complete window appears, click on its finish button to complete the installation.

k. If possible, reboot the computer.

l. The installation installs a shortcut on the desktop for the CHART II GUI and a folder containing shortcuts to start each of the CHART II services.

Post Installation Step – CHART II server applications are installed to run as NT Services. This allows the CHART II Servers to run while no user is logged into the server machine and also provides the ability for automatic start-up of the servers when the server is booted.

1. Reboot the computer if not done as part of the installation. When the computer restarts, the CHART II servers will start automatically.
2. Verify that the services are running. Use the Service Control Manager to check that all Chart2 services have a status of "started". These services have names that begin with "Chart2-".
3. Verify that there were no errors during the service start-up. This is done by checking each of the CHART II Server's log files for an entry that indicates the service has started successfully. The log files can be found in the \bin folder of the installation directory under the service folder for each service and are named "UMService_", "MsgUtilServiceDev_", TrafficEventService_", "PlanService_" and "DMSService_" with the current date appended, *e.g.* "DMSService_991203". These files are standard text files and can be viewed with Notepad (but *not* WordPad since the most current files are in use).

A.1.4 Installation Instructions for Field Management Station (FMS) Server

This section describes the procedure for installing the CHART II FMS services on an FMS server.

1. Uninstall any previous versions of the FMS R1B2A software or the JRE. Do not uninstall the FMS R1B1 software if this server is currently supporting R1B1 operations. To uninstall the CHART II R1B2A software do the following:
    a. Log into the target machine with administrator privileges.
    b. Select Settings>Control Panel from the Start menu.
    c. Double-click on Services
    d. Stop the Chart2CommService, then close the Services application
    e. Go to the bin folder of the CHART II installation directory
    f. Remove the Comm service from the Registry. Under the CommService folder is a file called *CommRemoveService.cmd.* Executing this file will remove the service from the Registry.
    g. Select Settings>Control Panel from the Start menu.
    h. Double-click on Add/Remove Programs

i. Select Chart II from the list.

j. Click the Add/Remove button and follow the instructions.

k. Part of the directory structure and some files may remain after running this step. These files can include property files, log files and other temporary files used by CHART. To remove these files, go to the installation directory and delete the Chart II directory and all of its contents.

l. If required, also remove the Java Runtime Environment.

2. Log into the target machine and insert the CHART II installation CD in the CD ROM drive.
3. If JRE 1.3 is not already installed on the target machine, run the j2re1_3_0-win.exe program (contained on the CHART II CD) and follow the on-screen instructions to install it. You need not restart the computer at this time.
4. Start the CHART II installation by running setup.exe from the CHART II installation CD.
5. Complete the installation by following the on-screen instructions as follows:

    a. Read the information on the Welcome screen and press the Next button to continue.

    b. Read the Information window and press the Next button to continue.

    c. Choose a folder where CHART II will be installed. It is recommended that the default directory on the D: drive (if available) be used for all servers to provide a common configuration across all servers. Press the Next button to continue.

    d. On the Select Components window select only the Comm Service. Press the Next button to continue.

    e. On the Select Program Folder window, enter a folder name (or accept the default) and press the Next button to continue. The data files will be copied from the installation media to the target system.

    f. On the TCP Port Assignments window, change the port numbers if necessary. The default values are usually OK unless some other application is already using one or more of these values.

    g. On the General Settings window, enter the name of the site where you are installing the servers. This name defaults to the host name, but can be any descriptive name for the site, such as “SOC Server Room”. Lastly, enter the number of days to keep log files (used to aid in service instances) or accept the default. Press the Next button to continue.

    h. On the Required Services Locations window, press the Finish button to finish the customized settings.

    i. When the Setup Complete window appears, click on its finish button to complete the installation.

    j. If possible, reboot the computer.

A.1.4.1 Installation Instructions for Multiple Communications Services on a Single FMS Server

In the event that communications ports of the same type on a single FMS server must be treated as more than one distinct resource, multiple Communications Services must be installed. In particular, in the case where both Eicon and Digi ISDN boards are installed in a single FMS, that FMS will require a separate Communications Service to serve ports on each board.

The steps below provide the procedure for installing and configuring multiple Communications Services on a single FMS.

1. Under the \bin folder of the installation directory create a sub-directory for each additional comm service. Use a descriptive name for the folder (e.g. DIGI-ISDNCommService).
2. Copy the contents of the \bin\CommService folder of the installation directory to the new sub-directory.
3. Using the file properties dialog, uncheck the Read-only box in the File Attributes for the following files:
   CommRemoveService.cmd
   CommService.cmd
   CommService.props
   CommServiceReg.cmd
4. Delete the *.id file from the new sub-directory (if it exists).
5. Edit the CommService.cmd file in the new directory to specify the location of the properties file.
6. Edit the CommService.props file in the new sub-directory.
   a) Specify a name for the additional port manager (parameter FieldCommunicationsModule.PortManagerName). This name should be a concatenation of the FMS server name and a descriptive string indicating the type of port manager (e.g. HANSOCFMS2-DIGI-ISDN). This name is also used to construct the communications service log file name.
   b) Change the port number (was 8007 if default was used during install) to any available TCP-IP port. If unsure, try 9007 as CHART services all use eight thousand numbers by default.
   c) Look in the CommService.props file for the name of the offers file (specified by parameter DefaultServiceApplication.OfferFilename) and delete the offers file from the new sub-directory if it exists.
7. Edit the CommServiceReg.cmd file in the directory.
   a) Modify the name of the service to a descriptive string indicating the type of service provided. The name of the service should start with the string “Chart2-“ so that it is easily identifiable as a CHART II service (e.g. Chart2-DIGI-ISDN).
   b) Modify the path location from where the new comm service will be run.
   c) Modify the location of the properties file.
8. Run the port configuration utility and modify the PortConfig.pcfg file to specify the ports this service will manage.

9. Run the modified CommServiceReg.cmd file. The newly added comm service should be available in the control panel services list.
10. Start the newly added comm service from the service control panel.
11. Edit the CommRemoveService.cmd file to change the comm service name to the name specified in step 7. This file will be used if it becomes necessary to remove the service.
12. Using the file properties dialog, check the Read-only box in the File Attributes for the following files:
    CommRemoveService.cmd
    CommService.cmd
    CommService.props
    CommServiceReg.cmd

A.1.4.2 Post Installation Instructions for FMS Server

FMS server applications are installed to run as NT Services. This allows the server applications to run while no user is logged into the server machine and also provides the ability for automatic start-up of the servers when the server is booted. Depending on the type of installation being performed it may be necessary to modify the status of the FMS services. Follow the post installation steps below for the type of installation being performed.

Installation on New Hardware or Existing R1B2A System

1. Reboot the computer if not done as part of the installation. When the computer restarts, the FMS services will start automatically.
2. Verify that the services are running. Use the Service Control Manager to check that all Chart2 services have a status of "started". These services have names that begin with "Chart2-".
3. Verify that there were no errors during the service start-up. This is done by checking each of the FMS Server's log files for an entry that indicates the service has started successfully. The log files can be found in the \bin folder of the installation directory under the service folder for each service and are named "CommService_" with the current date appended, *e.g.* "CommService_991203". These files are standard text files and can be viewed with Notepad (but not WordPad since the most current files are in use).

Installation on Existing R1B1 System

1. Use the Service Control Manager to check that all Chart2 services have a status of "started". These services have names that begin with "Chart2-". Now stop all Chart2 servers and set the Startup Type of each Chart2 service to "disabled".
2. Once the decision has been made to transition this FMS server from R1B1 to R1B2A the following steps should be performed:
    a. Set all devices on this FMS server to offline
    b. Use the Service Control Manager to stop the Watchdog service then set the Startup Type of the Watchdog service to "disabled".

c. Use the Service Control Manager to stop the SNMP EMANATE Master Agent service then set the Startup Type of the SNMP EMANATE Master Agent service to “disabled

3. Use the Service Control Manager to start the Chart2-CommService and set the Startup Type of the Chart2-CommService to “Automatic”.
4. Verify that there were no errors during the service start-up. This is done by checking each of the FMS Server’s log files for an entry that indicates the service has started successfully. The log files can be found in the \bin folder of the installation directory under the service folder for each service and are named “CommService_” with the current date appended, *e.g.* “CommService_991203”. These files are standard text files and can be viewed with Notepad (but not WordPad since the most current files are in use).
5. Set devices online as needed.

A.1.4.1 Port Manager Configuration

After installing and starting the CommService process on the FMS server run the port manager configuration utility (PortConfigUtility.cmd) located in the \bin\CommService folder in the installation directory. Use this utility to configure the available communications ports.

> *If running the port manager configuration utility remotely using Remotely Possible you must set the FMS server’s display properties characteristics to 800x600 and 256 colors (right click in the display and select Properties and then Settings). After starting the port manager configuration utility click on the Test button in the display Setting dialog. The port manager configuration utility window should now display properly. Each time you start the utility you must click on the Test button in the display Settings dialog.*

Use the File menu to create a new configuration file. Then from the Edit menu select the appropriate option to add direct connections, POTS modems, or ISDN modems for each communications port to be configured on the server.

For all types of ports enter a name to identify the port, check the Port Enabled box to enable the port, and then specify the system device name for the port (*e.g.* COM1). It is recommended that the system device name be used for the port name to avoid confusion (*e.g.* system device COM1 is given port name COM1). For the modems you will also need to enter the modem initialization string (see below) and the modem connect timeout (the length of time in minutes the modem will wait for a connection to be established after dialing). Use care in entering the initialization strings to make sure that the number zero is not entered as the letter O.

Modem Initialization Strings:

- Eicon ISDN ATE0Q0V1+ip6
- Digi ISDN ATE0Q0V1
- POTS AT&F0E0Q0V1F4&K0&Q4+MS=1,0,300,1200

When you have finished setting the port configurations make sure you use the File menu to save your changes before exiting the application.

A.2 CHART II Database Installation

The CHART II databases will reside on the HANOVERCHART1 server where the AVCM database resides. The CHART II database and installation packages are designed to be compatible with the AVCM database.

The DBA working remotely should know that this document is written for local installation. Therefore, the remote DBA will be required to first copy the scripts from the workstation to the server and then install through a network tool such as Remotely Possible. All other instructions are the same for both local and remote management.

Production installation will be accomplished via the delivered CD. This may occur after the system is delivered and a database needs to be reinstalled for any reason or a new site comes online.

A.2.1 Intended Audience

The intended audience for the installation procedures is someone who

- is familiar with Windows NT
- has ORACLE 8i Enterprise Edition DBA experience.

A.2.2 CHART II R1B2A Database Installation

The installation package:

- Creates entries in the HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\HOME registry key during the Oracle8i creation of the CHART II database. The new values will be prefaced by ORA_SOC2.
- Creates files and/or directories in the following existing directories on the D: drive of the database server where the Oracle product has been installed.
  - ORACLE\ADMIN
  - ORACLE\ORA81\NETWORK\ADMIN
  - ORACLE\ORADATA

The installation procedures will provide the following:

- Copies the database directory structure and files to the database server's D: drive. Also, updates Oracle configuration files with the database information.
- Creates the database, users, tables, triggers, sequences, constraints, and indexes.
- Preloads data that will not interfere with the Data Migration Utility.
- Migrates the R1B1 data.

- Loads the remaining R1B2A data.
- Changes the default passwords.

A.2.2.1 Install Database Files and Directory Structure

Perform the following steps:

1. Using Explorer, navigate to the CHART II R1B2A database Installation media.
2. Double-click on the ***Setup.exe*** file. The installation Welcome window appears.
3. Click the ***Next*** button. The "What do you want to Install?" window appears.
4. Click the ***Next*** button to accept the CHART II database default. The installation process will copy the database scripts to the hard drive and update the TNSNAMES.ORA and LISTENER.ORA files.
5. The Installation Complete message box will appear when installation is complete.
6. Click the ***OK*** button. The Installation windows close.

A.2.2.2 Create Database

1. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\create\automated_setup** directory.
2. Double click on the ***CREATE_DATABASE.BAT*** file. A DOS window will appear, which will execute scripts that will create the database. The status of the database creation is displayed in the DOS window.
3. In approximately 20 minutes, the DOS window will disappear.
4. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\create\logs** directory.
5. Double click on the ***CREATE_DATABASE.LOG*** file. It will open in Notepad.
6. Scroll to the bottom of the file and verify that the following text appears "Successfully created the C2SOC2 database objects".
7. Close Notepad.

A.2.2.3 PreLoad Data

1. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\pop** directory.
2. Double click on the ***PRELOAD_TABLES.BAT*** file. A DOS window will appear, which will execute SQL Loader scripts to populate some of the tables.
3. After about 1 minute, the following text will appear at the bottom of the DOS window: "Press any key to continue . . .".
4. In the DOS window, press the ***Enter*** key. The DOS window closes.
5. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\pop** directory.
6. Double click on the ***PreLOAD_DATA.LOG*** file. It will open in Notepad.
7. Select the ***Search…Find*** menu item. The Find window will appear.
8. Type **`ORA-`** in the "Find what" field and click on the ***Find Next*** button.
9. Verify that a message box appears stating that the text could not be found. This means that no Oracle database errors occurred during the execution of this script.
10. Repeat step 7 and type **`SQL*Loader-`** in the "Find what" field and click on the ***Find Next*** button.

11. Verify that a message box appears stating that the text could not be found. This means that no SQL Loader errors occurred during the execution of this script.
12. Close Notepad.

A.2.2.4 Migrate R1B1 Data

1. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\migration** directory.
2. Double click on the ***SETUP_CHRT2SOC.BAT*** file. An SQL*Plus window will appear prompting you for a password.
3. Enter the password for the CH2DBA user. SQL*Plus will execute a script that will create the migration user and grant privileges to the user in the R1B1 database. The SQL*Plus window will close automatically when the script is complete.
4. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\migration\logs** directory.
5. Double click on the ***SETUP_CHRT2SOC_DB.LOG*** file. It will open in Notepad.
6. Select the ***Search…Find*** menu item. The Find window will appear.
7. Type **ORA-** in the "Find what" field and click on the ***Find Next*** button.
8. Verify that a message box appears stating that the text could not be found. This means that no errors occurred during the execution of this script.
9. Close Notepad.
10. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\migration** directory.
11. Double click on the ***SETUP_C2SOC2.BAT*** file. An SQL*Plus window will appear prompting you for a password.
12. Enter the password for the CH2DBA user. SQL*Plus will execute a script that will create the migration user and grant privileges to the user in the R1B2A database.
13. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\migration\logs** directory.
14. Double click on the ***SETUP_C2SOC2_DB.LOG*** file. It will open in Notepad.
15. Select the ***Search…Find*** menu item. The Find window will appear.
16. Type **ORA-** in the "Find what" field and click on the ***Find Next*** button.
17. Verify that a message box appears stating that the text could not be found. This means that no errors occurred during the execution of this script.
18. Close Notepad.
19. Migrate the R1B1 data by executing the procedures in Sections A.4 and A.5 of the "CHART II Release 1 Build 2a Data Migration Plan".
20. Using Explorer navigate to the **d:\oracle\admin\c2soc2\migration** directory.
21. Double click on the **dump_database_records.bat file**. A program will run that will dump the contents of the R1B1 and R1B2A migration tables to the logs subdirectory. When the script is done the DOS prompt will close.

A.2.2.5 PostLoad Data

1. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\pop** directory.
2. Double click on the ***POSTLOAD_TABLES.BAT*** file. A DOS window will appear, which will execute SQL Loader scripts to populate some of the tables.
3. After about 1 minute, the following text will appear at the bottom of the DOS window: "Press any key to continue . . .".

4. In the DOS window, press the ***Enter*** key. The DOS window closes.
5. Return to Explorer and double click on the ***PostLOAD_DATA.LOG*** file. It will open in Notepad.
6. Select the ***Search…Find*** menu item. The Find window will appear.
7. Type **`ORA-`** in the "Find what" field and click on the ***Find Next*** button.
8. Verify that a message box appears stating that the text could not be found. This means that no Oracle database errors occurred during the execution of this script.
9. Repeat step 6 and type **`SQL*Loader-`** in the "Find what" field and click on the ***Find Next*** button.
10. Verify that a message box appears stating that the text could not be found. This means that no SQL Loader errors occurred during the execution of this script.
11. Close Notepad.

A.2.2.6 Change the Database Passwords

1. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\create** directory.
2. Double click on the ***STEP3.BAT*** file. An SQL*Plus window will appear.
3. Change the passwords for the following users:
   - SYSTEM
   - SYS
   - CH2DBA
   - OUTLN
   - ARCHIVE
   - REPORT
   - DBSNMP
4. Coordinate with Configuration Management personnel and set the passwords for the following users appropriately:
   - DMSSERVICE
   - MESSAGEUTILITYSERVICE
   - TRAFFICEVENTSERVICE
   - TSSSERVICE
   - USERMANAGEMENTSERVICE
5. To change the password, use the following syntax:
   `ALTER USER <username> IDENTIFIED BY <password>;`
6. At the prompt type: **`@d:\oracle\admin\c2soc2\pop\analyze`** and press the ***Enter*** key. A script will execute and the SQL*Plus window will close.
7. Using Explorer, navigate to the **d:\oracle\admin\c2soc2\create** directory and double click on the **analyze.log** file. The file will open in notepad.
8. Verify that no errors exist in the file.

A.2.3 CHART II Interim Archive Database Installation

The installation package:

- Creates entries in the HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\HOME registry key during the Oracle8i creation of the CHART II Interim Archive database. The new values will be prefaced by ORA_C2ARCH2.
- Creates files and/or directories in the following existing directories on the D: drive of the database server where the Oracle product has been installed.
  - ORACLE\ADMIN
  - ORACLE\ORA81\NETWORK\ADMIN
  - ORACLE\ORADATA

The installation procedures will provide the following:

- Copies the database directory structure and files to the database server's D: drive. Also, updates Oracle configuration files with the database information.
- Creates the database, users, roles, tables, constraints and indexes. Also, creates the stored procedure that copies and purges data from the CHART II database.
- Migrates the R1B1 OPERATIONS_LOG data.
- Changes the default passwords.
- Creates a database link to the CHART II database.
- Creates the Job that copies and purges data from the CHART II database on a daily basis.

A.2.3.1 Install Database Files and Directory Structure

Perform the following steps:

1. Using Explorer, navigate to the CHART II Interim Archive database Installation media.
2. Double click on the ***Setup.exe*** file in the DB_INSTALL folder. The installation Welcome window appears.
3. Click the ***Next*** button. The installation process begins. The installation process will copy the database scripts to the hard drive and update the TNSNAMES.ORA and LISTENER.ORA files.
4. The Installation Complete message box will appear when installation is complete.
5. Click the ***OK*** button. The Installation windows close.

A.2.3.2 Create Database

1. Using Explorer, navigate to the **d:\oracle\admin\c2arch2\create\automated_setup** directory.
2. Double click on the ***CREATE_DATABASE.BAT*** file. A DOS window will appear, which will execute scripts that will create the database. The status of the database creation is displayed in the DOS window.
3. In approximately 20 minutes, the DOS window will disappear.
4. Using Explorer, navigate to the **d:\oracle\admin\c2arch2\create\logs** directory.
5. Double click on the ***CREATE_DATABASE.LOG*** file. It will open in Notepad.
6. Verify that no errors appear in the text.

7. Close Notepad.

A.2.3.3 Migrate C2ARCH Data

1. Using Explorer, navigate to the **d:\oracle\admin\c2arch2\migration** directory.
2. Double click on the ***SETUP_C2ARCH.BAT*** file. An SQL*Plus window will appear prompting you for a password.
3. Enter the password for the CH2DBA user. SQL*Plus will execute a script that will create the migration user and grant privileges to the user in the C2ARCH database.
4. Using Explorer, navigate to the **d:\oracle\admin\c2arch2\migration\logs** directory.
5. Double click on the ***SETUP_C2ARCH_DB.LOG*** file. It will open in Notepad.
6. Select the ***Search…Find*** menu item. The Find window will appear.
7. Type **ORA-** in the "Find what" field and click on the ***Find Next*** button.
8. Verify that a message box appears stating that the text could not be found. This means that no errors occurred during the execution of this script.
9. Close Notepad.
10. Using Explorer, navigate to the **d:\oracle\admin\c2arch2\migration** directory.
11. Double click on the ***SETUP_C2ARCH2.BAT*** file. An SQL*Plus window will appear prompting you for a password.
12. Enter the password for the CH2DBA user. SQL*Plus will execute a script that will create the migration user and grant privileges to the user in the C2ARCH2 database.
13. Using Explorer, navigate to the **d:\oracle\admin\c2arch2\migration\logs** directory.
14. Double click on the ***SETUP_C2ARCH2_DB.LOG*** file. It will open in Notepad.
15. Select the ***Search…Find*** menu item. The Find window will appear.
16. Type **ORA-** in the "Find what" field and click on the ***Find Next*** button.
17. Verify that a message box appears stating that the text could not be found. This means that no errors occurred during the execution of this script.
18. Close Notepad.
19. Migrate the C2ARCH data by executing the procedures in Section A.6 of the "CHART II Release 1 Build 2a Data Migration Plan".

A.2.3.4 Change the Database Passwords

1. Using Explorer, navigate to the **d:\oracle\admin\c2arch2\create** directory.
2. Double click on the ***STEP4.BAT*** file. An SQL*Plus window will appear.
3. Change the passwords for the following users:
   - SYSTEM
   - SYS
   - CH2DBA (this password must match the c2soc2 database password for this user)
   - OUTLN
   - ARCHIVE_USER
   - DBSNMP
   - RMANCHART2
4. To change the password use the following syntax:

`ALTER USER <username> IDENTIFIED BY <password>;`

5. At the prompt type: **`@d:\oracle\admin\c2arch2\create\designer\cr_c2arch2.dbl`** and press the ***Enter*** key. You will be prompted for the CH2DBA password.
6. Enter the appropriate password for user CH2DBA in the C2ARCH2 database and press the ***Enter*** key. A script will execute.
7. Verify that no errors appear in the SQL*Plus window.
8. Close SQL*Plus.

A.2.3.5 Setup Automated Data Load and Purge

- Using Explorer, navigate to the **d:\oracle\admin\c2arch2\create** directory.
- Double click on the ***STEP5.BAT*** file. An Oracle SQL*Plus window will appear prompting you for a password.
- Enter the password for the user: CH2DBA. SQL*Plus will execute the get_operational_data.sql script. This script performs the following:
  a) Loads the local tables with data that was created prior to today.
  b) Creates a job that runs the "GetOperationalData.GetData" procedure every day at 3:00 AM. This procedure will add data from the operational database to the archive tables.
- In approximately 2 seconds, the SQL*Plus window will disappear and notepad will appear with the results of the scripts.
- Scroll down the file and verify that no errors occurred.
- Close Notepad.

A.2.4 Create NT User for Oracle Enterprise Manager Jobs

Oracle Enterprise Manager requires an NT user account to run jobs on a database server. If the database server is a Member server, then a local user account needs to be created. If the database server is a Domain server, then a domain user account needs to be created.

1. Select the User Manager from the Administrative Tools via the Windows NT Start Menu. This can also be run from the DOS command line by entering **`usrmgr`** in the command line window.
2. If the database server is a Member server, perform the following:
   – Select **User > Select Domain…** from the menu. The Select Domain window appears.
   – In the Domain field type the name of the local server and click the ***OK*** button.
3. Scroll down the list of users and verify that the user oracle_backup exists. If the user exists, skip the remaining steps in this section and proceed to Section A.2.5. If the oracle_backup user does not exist, then perform the remaining steps to create the user.
4. Select ***New User*** from the User menu and perform the following in the New User property sheet:
   a) In the Username field enter **`oracle_backup`**.
   b) In the Description field enter **`Oracle database backup user`**.

c) In the Password and Confirm Password fields, enter a password**.**
d) Deselect the ***User Must Change Password at the Next Logon*** check box.
e) Click the ***Add*** button. The user information is cleared.
f) Click the ***Close*** button. The New User window closes.

5. Select ***User Rights*** from the Policies menu. The User Rights Policy property sheet appears.
6. Check the ***Show Advanced User Rights*** box at the bottom of the property sheet.
7. Select ***Logon as a batch job*** from the Right drop down list.
8. Click the ***Add*** button. The Add Users and Groups window appears.
9. Make sure the local computer name is displayed in the List Names From drop down box.
10. Click the ***Show Users*** button. Select the oracle_backup user from the Names list box. Click the ***Add*** button. The user appears in the Add Names list box.
11. Click the ***OK*** button. The Add Users and Groups window closes. The name appears in the Grant To list box on the User Rights Policy window.
12. Click the ***OK*** button. The User Rights Policy window closes.
13. Close the User Manager.

A.2.5 Post Installation Tasks

1. The new DBSNMP password needs to be added to the snmp_rw.ora file on the HANOVERCHART1 server so that the Oracle Agent can access the databases. Perform the following:
   - Open the d:\oracle\ora81\network\admin\snmp_rw.ora file on the HANOVERCHART1 server in notepad
   - Add the following as the last lines of text (substitute the actual password for "<password>":

     "`snmp.connect.C2SOC2.CHART_DOM.PASSWORD = "<password>"`

     "`snmp.connect.C2ARCH2.CHART_DOM.PASSWORD = "<password>"`
   - Save the file and Close notepad.
   - Change the access permissions on this file so that only the following groups have access and they have full control access rights: SYSTEM, ORA_DBA, ORACLE ADMIN, and domain admins.
2. Select ***Services*** from Control Panel.
3. Select the ***OracleHomeAgent*** service.
4. Click the ***Stop*** button to stop the service.
5. Click the ***Start*** button to restart the service. Restarting this service will ensure that Oracle Enterprise Manager will see the new databases.
6. Select the OracleHomeListenerChart2 service.
7. Click the ***Startup*** button. The Service window appears.
8. Under Startup Type, click the ***Automatic*** radio button.
9. Click the ***OK*** button. The Service window closes.
10. Close the Services window.
11. Close the Control Panel window.

12. Using Explorer, copy the following files from the **d:\oracle\ora81\database** directory to the **d:\oracle\oradata\backup** directory.
    - Pwdc2arch2.ora
    - Pwdc2soc2.ora
13. Log off of the database server.
14. Perform the procedures in sections A.3 and A.4

A.3 CHART II Enterprise Manager Setup

The CHART II database will be managed through the Oracle Enterprise Manager (OEM). The following steps perform the OEM setup. These steps need to be performed once for each database server. The CHART II database installation created a remote user on the server with SYSDBA privilege. This setup starts with the client.

A.3.1 Enterprise Manager Client Configuration Procedure

This procedure will allow you to startup and shutdown your target database remotely. Perform the following procedure on one of the Enterprise Manager clients.

1. Login to the OEM Console.
2. Double click on the Databases item to expand the list of databases.
3. Select ***Discover Nodes*** from the Navigator menu item. The Discover Nodes window appears.
4. Enter the name of the target database server and click the ***OK*** button. A "Status: Add Nodes" window appears and the cursor changes to an hourglass. In a few seconds the text in the Status column will change to "Added".
5. Close the "Status: Add Nodes" window. The window closes returning you to the OEM Console, where the new database will appear in the Navigator.
6. Select ***Preferences*** from the System menu. The Edit Administrator preferences property sheet appears.
7. Select the ***Preferred Credentials*** tab to view the services available for management.
8. Select the C2SOC2 database from the list.
9. Enter **`CH2DBA`** in the Username field and the appropriate password in the Password and Confirm Password fields. In the Role field, select ***SYSDBA*** from the drop down list. This will be the default user that Oracle Enterprise Manager uses to connect to the C2SOC2 database and to startup and shutdown the database.
10. Repeat steps 8 and 9 for the C2ARCH2 database.
11. Scroll to the bottom of the list of Service Names.
12. Select the row that has a Service Type of Node and a Service Name that matches the name of the database server.
13. In the Username field enter **`oracle_backup.`** In the Password and Confirm Password fields, enter the password for this user. This user should have been created during installation of the database. Click the ***OK*** button. The Edit Administrator preferences window closes. The oracle_backup user allows the Enterprise Manger to remotely backup the database. Enterprise manager uses this user to log into the database server remotely and backup up the database.

14. Select the C2SOC2 database from the Navigator.
15. Double click on the C2SOC2 database icon to expand the list. This also logs you into the database.
16. Click the right mouse button on the Initialization Parameters item. Select ***Edit*** from the pop-up menu. The Edit Init Parameters property sheet appears.
17. Click ***OK***. A message box appears asking: "Do you want to save the current set of parameters as a configuration?"
18. Click the ***Yes*** button. The Save Initialization Parameter property sheet appears.
19. Enter a configuration name. For example, REMOTE_SOC.
20. Enter any comments you wish to appear in the Comments column of the Stored Configuration multi-column list.
21. Click ***OK***. A message box appears stating "Stored Configuration created successfully".
22. Click ***OK***. The message box and Edit Init Parameters property sheet closes returning you to the console.
23. Test the remote ***SYSDBA*** login. Click the right mouse button on the Database icon in the Navigator pane. Click on ***Shutdown*** to shutdown the database. After the database is shutdown, click the right mouse button on the Database icon and click on Startup from the pop-up menu to start the database. You should be able to startup and shutdown the database using the stored configuration you have created.
24. Repeat steps 14 - 23 for the C2ARCH2 database.
25. Close the Enterprise Manager Console.

A.3.2 Recovery Catalog Setup

This procedure needs to be performed once. Backup and recovery information will be stored in the Recovery Catalog. The Recovery Catalog will reside in the Enterprise Manager database. A tablespace and recovery manager user will be created. The procedures follow.

A.3.2.1 Create Tablespace

1. Start Storage Manager.
2. Login into the Oracle Enterprise Manager (OEM) database as user SYSTEM.
3. Click the right mouse button on the Tablespace folder. A pop-up menu appears.
4. Select Create from the pop-up menu. The Create Tablespace property sheet appears.
5. In the Name field, enter **`rcvcat`**.
6. Click the Add button in the Datafiles section. The Create Datafile property sheet appears, allowing you to specify a new datafile that will belong to the new tablespace.
7. In the Name field, type **`d:\oracle\oradata\emrep\rcvcat01.dbf`**. This assumes that the datafiles for the Enterprise Manager database are in the **d:\oracle\oradata\emrep** directory.
8. In the Size section, enter **`20`** and select M Bytes from the drop down list.
9. Click the ***OK*** button in the Create Datafile property sheet.
10. Click the ***Create*** button in the Create Tablespace property sheet. A message box appears stating: "Tablespace created successfully".
11. Click the ***OK*** button. The message box and property sheet closes.

12. Close Storage Manager.

A.3.2.2 Create Catalog User

1. Start Security Manager.
2. Log into the OEM database as user SYS.
3. Click the right mouse button on the User folder. A pop-up menu appears.
4. Select ***Create*** from the pop-up menu. The Create User property sheet appears.
5. In the General Page, fill in the following information:
6. In the Name field, enter **`rmanchart2`**.
7. In the Password and Confirm Password fields, enter a password**.**
8. Choose ***RCVCAT*** as the default tablespace.
9. Choose the ***temporary*** tablespace.
10. In the Roles Page, select the ***RECOVERY_CATALOG_OWNER*** role and then click on the down arrow icon to move the privilege to the Granted list.
11. In the Quotas Page, select the ***RCVCAT*** row and then select the ***Unlimited*** radio button at the bottom of the tab.
12. Click the ***Create*** button. A message box appears stating: "User created successfully".
13. Click the ***OK*** button. The message box and property sheet close.
14. Close User Manager.

A.3.2.3 Create the Recovery Catalog

1. From the Enterprise Manager database server, open a DOS window.
2. Connect to the recovery catalog by entering the following:

   `rman rcvcat rmanchart2@emrep`
3. You will be prompted for a password**.** Enter the appropriate password and press the ***Enter*** key.

   The correct output is shown below:

   ```
   RMAN-06008:  connected to recovery catalog database
   RMAN-06248:  recover catalog is not installed
   ```
4. Issue the create catalog command to create the catalog:

   RMAN> **`create catalog tablespace "RCVCAT";`**

   The correct output is shown below:

   ```
   RMAN-06431:  recovery catalog created
   ```
5. Type **`exit`** at the RMAN prompt to close RMAN.
6. Type **`exit`** at the DOS prompt to close the DOS window.

A.3.2.4 Registering the Recovery Catalog

1. Login to the OEM Console.
2. In the Navigator pane, double click on the Databases item to view the list of databases.
3. Click the right mouse button on the target database. A pop-up menu appears.

4. Select ***Backup Management > Create Backup Configuration*** from the pop-up menu. The Create Backup Configuration window appears.
5. In the Name field enter **`CHARTII_BACKUP`**.
6. In the Description field enter **`Perform Hot backup of CHART II database`**.
7. Click the ***Channels*** tab. In the Channel Name field enter **`Ddrive`**.
8. In the File Name field enter **`b_%d_%s_%t`**.

   The substitution variables in the backup file name are defined as follows:

   - %d – specifies the database name
   - %s – specifies the backup set number. This number is a counter in the control file that is incremented for each backup set. The counter value starts at 1 and is unique for the lifetime of the control file. If you restore a backup control file, then duplicate values can result.
   - %t – specifies the backup set timestamp, which is a 4-byte value derived as the number of seconds elapsed since a fixed reference time. The combination of %s and %t can be used to form a unique name for the backup set.

9. In the Directory field enter **`d:\oracle\oradata\backup\`**.
1. Click the ***Recovery Catalog*** tab. Fill in the following information:
   - Select the ***In a recovery catalog*** radio button.
   - In the Username field, enter **`rmanchart2`**.
   - In the Password field, enter the appropriate password**`.`**
   - In the Service field, select ***emrep*** from the drop down list.
2. Click the ***Create*** button. A message box will appear indicating that the database is not registered in the recovery catalog.
3. Click the ***Register*** button. The message box and Create Backup Configuration window close.

A.4 CHART II Database Maintenance Setup

This section describes the procedures for setting up the Enterprise Manager jobs and events as listed in Table A-1. Jobs perform a task on a daily basis, such as backing up the database. Events monitor the databases or servers for specific conditions, such as a downed database and provide an alert to the user when the specific condition occurs.

Backup Note

Ideally, the Control file, Online Redo Log files, and Archived Redo Logs are written to multiple hard drives during database operation to minimize the chance that they will be lost. However the CHART II database only has write access to the D: drive of the database server. Therefore, these files reside on one disk.

At least one copy of each of the Online Redo Log files and the Archived Redo Logs are required to recover the database up to the point that it failed. Otherwise, the database can only be recovered up to the point of the last available sequential archived redo log. For example, if the

second of three archived redo log files is missing, then the database can only be recovered to the first archived redo log file. The third archived redo log file is useless without the second one. Therefore, if the D: drive crashes, any data entered after the last backup will be lost, since all redo logs created since the last backup are on the failed D: drive and inaccessible. The database, after recovery, will be current as of the last backup.

Procedures are provided for setting up the following Enterprise Manager jobs and events:

Table A–1. OEM Maintenance Setup

Enterprise Manager Job/Event	Paragaph Reference	Frequency of Job/Event
1. Create CHART II C2SOC2 Database Backup	A.4.1	Daily at 1:30AM
2. Create CHART II C2ARCH2 Database Backup	A.4.2	Daily at 1:45AM
3. Create EMREP Database Backup	A.4.3	Daily at 3:30AM
4. Create CHART II Export Job	A.4.4	Daily at 2:30AM
5. Create CHART II DLT Tape Backup Job	A.4.5	Daily at 3:00AM
6. Create “Remove Aged CHARTII Database Backup Files” job	A.4.6.1	Daily at 2:45AM
7. Create “Remove Aged Enterprise Manager Database Backup Files” job	A.4.6.2	Daily at 3:45AM
8. Create “Remove Aged CHARTII Log Files” job	A.4.6.3	Daily at 3:15AM
9. Create “Process CHARTII TSS Raw Data Files” job	A.4.6.4	Daily at 12:45AM
10. Create “Comm_Failure_Log Report” job	A.4.7	Daily at 12:30 AM
11. Configure Enterprise Manager Events	A.4.8	Every 5 minutes

A.4.1 Backup Procedure for the CHART II Database

The backup procedures consist of configuring a backup job via the OEM. The job will run daily. The following activities will be accomplished:

- CHART II Database Recovery Catalog Registration
- CHART II Database Backup Procedures

Parameters of the **Chart II database** backup implementation follow:

- Backup Type: Online. The database will be fully functional during the backups.
- Backup Time: 1:30 AM daily
- Backup Directory: d:\oracle\oradata\backup
- Format: the files will be compressed into 2 or more files in the backup directory. The Recovery Catalog is used for tracking backup activity.
- Database files being backed up consists of:

CHART2_DATA01.DBF	CONTROL01.CTL	SOC2RBSBIG01.DBF
CHART2_INDEX01.DBF	CONTROL02.CTL	SOC2USERS01.DBF
CHART2_LOB01.DBF	SOC2INDX01.DBF	SOC2SYSTEM01.DBF
CHART2_STATIC_DATA01.DBF	SOC2OEMREP01.DBF	SOC2TEMP01.DBF
CHART2_STATIC_INDEX01.DBF	SOC2RBS01.DBF	<Archived redo logs>

- Database files not being backed up consist of:
  - Online Redo Log Files. Oracle strongly recommends that these files should not be backed up.

A.4.1.1 Register the Database with the Recovery Catalog

The database must be registered with the Recovery Catalog database before the Backup job can be created. The following steps perform the registration task.

1. Logon to the Enterprise Manager Console on the Enterprise Manager workstation using the SYSMAN user id.
2. In the Navigator pane, double click on the Databases item to view the list of databases.
3. Click the right mouse button on the C2SOC2 database. A pop-up menu appears.
4. Select ***Backup Management > Catalog Maintenance*** from the pop-up menu. The Catalog Maintenance window appears.
5. Click the ***Next*** button.
6. In the Operation Choice Page, choose ***Register Database***.
7. Click the ***Next*** button.
8. In the Configuration Page, ensure that you are using the CHARTII_BACKUP configuration.
9. Click the ***Next*** button.
10. In the Multiple Destinations Page, ensure the C2SOC2 database is in the Selected Destinations list.
11. Click the ***Finish*** button. At this point, the database registration is sent as a job to the OEM Job system.
12. When the Summary screen appears, click ***OK*** to complete the operation.
13. In the Console, look in the Active tab of the Jobs Pane at the Status column of the first row. The status of the job will change from Scheduled to Started in a few seconds. Once the job task is completed, the job will disappear from the Active tab and reappear at the top of the History tab of the Job Pane.
14. Click on the ***History*** tab in the Jobs pane. The History tab will become active. Verify that the status of the first row is Completed (Not Failed). If the status of the Job is Failed, then the database may have already been registered with the catalog. To check this, perform the following:
    a) Double click on the failed row in the Job pane. The Edit Job property sheet appears.
    b) Double click on the Failed row in the list box. The Job Output property sheet appears.

c) Look for "RMAN-20002" in the output window. This indicates that the database was already registered.
d) Close the Job Output window.
e) Close the Edit Job window.

A.4.1.2 Create a Backup Job Procedure

The following are the procedures for configuring the backup job of the Oracle database. These procedures create three items, (1) a backup job, (2) an SQL script to force the database to archive the current redo log, and (3) a TCL script to remove any archive logs for this database from the backup directory and copy the new archive log to the backup directory. The archive log will be needed for disaster recovery of the database.

1. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
2. In the General tab enter the following information:
   a) In the Job Name field, enter **`C2SOC2_Backup`**
   b) In the Destination Type field, select ***Database*** from the drop down list.
   c) Select ***C2SOC2.CHART_DOM*** from the Available Destinations list box and click the ***Add*** button. C2SOC2.CHART_DOM appears in the Selected Destinations list box.
   d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
3. In the Tasks tab page, select ***Backup*** in the Available Tasks list box and click the ***Add*** button. "Backup" appears in the Job Tasks list box.
4. Select ***Run SQL*Plus Script*** in the Available Tasks list box and click the ***Add*** button. "Run SQL*Plus Script" appears in the Job Tasks list box as the second item.
5. In the lower left corner of the Tasks tab page, select the ***Only on success of*** radio button. Backup will appear in the field to the right of the radio button, and the "Run SQL*Plus Script" text will be indented in the Job Tasks list box.
6. Select ***Run TCL Script*** in the Available Tasks list box and click the ***Add*** button. "Run TCL Script" appears in the Job Tasks list box as the third item.
7. In the lower left corner of the Tasks tab page, select the ***Only on success of*** radio button. Verify that Backup appears in the field to the right of the radio button. If it does not appear, then click on the dropdown button and select it. When you are done, Backup will appear in the field to the right of the radio button, and the "Run TCL Script" text will be indented in the Job Tasks list box at the same level as the "Run SQL*Plus Script".
8. In the Parameters tab page, select ***Backup*** from the Selected Tasks list box. A Details button will appear.
9. Click on the ***Details*** button. The Backup Wizard window appears.
10. Click the ***Next*** button to accept the Predefined backup strategy. The Backup Wizard Backup Frequency window appears.
11. Select the second radio button for ***Full backup everyday***.
12. Click the ***Next*** button. The Backup Wizard Backup Time window appears.
13. Click the ***Next*** button to accept the default of 12 midnight. The Backup Wizard Configuration window appears.

14. Ensure that CHARTII_BACKUP is displayed in the "Choose the configuration for this backup" field. Select it from the drop down list, if necessary.
15. Click the ***Finish*** button. The Backup Wizard Configuration window closes returning you to the Parameters tab of the Create Job window.
16. Select the "Run SQL*Plus Script item from the Selected Tasks list box. The right side of the tab page changes.
17. Enter the following in the Script Text text box:

```
alter system archive log current;
alter database backup controlfile to
'd:\oracle\oradata\backup\c_c2soc2control.ctl' reuse;
```

18. Select the "Run TCL Script" item from the Selected Tasks list box. The right side of the tab page changes.
19. Enter the following in the TCL Script text box:

```
catch { rmfile d:\\oracle\\oradata\\backup\\C2SOC2*.arc } output
puts $output
set output [exec copy d:\\oracle\\oradata\\C2SOC2\\archive\\*.arc
d:\\oracle\\oradata\\backup\\*.*]
puts $output
```

    Note that the fourth and fifth lines in the above text is actually a single line of text, so make sure there are only five lines of text in the text box.
20. In the Schedule tab page perform the following:
    a) select the ***On Interval*** radio button.
    b) In the Time field, perform the following:
        – Select the hours portion of the time and enter 1
        – Select the minutes portion of the time and enter 30
        – If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.
    c) Select the ***every*** radio button at the bottom of the window
    d) In the Days field, enter 1.
21. Click the ***Submit&Add*** button. The Create Job window closes.
22. In the Job pane, note the addition of a new row representing the recently created backup job. This job will run at 1:30AM.

A.4.1.3 Immediate Backup Configuration

Perform the following steps to immediately run the Backup job in the Job library.

1. From the Enterprise Manager Console, select the Job Library item from the Job menu. The Job Library window will open.
2. Select the C2SOC2_Backup item from the Job Name list box and click the ***Create Like*** button. The "Create Job" window appears.
3. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "C2SOC2_Backup1".
4. In the Schedule tab, select the ***Immediately*** radio button.

5. Click the ***Submit*** button. The Create Job window closes returning you to the Job Library window.
6. Click the ***Close*** button. The Job Library window closes.
7. In the Job pane, note the addition of a new row with the name "C2SOC2_Backup1". This job will run immediately and only once.
8. The Status column value for the backup job will change from submitted to scheduled to started. Finally the job will disappear from the Active tab and reappear on the History tab.
9. After the job disappears from the Active tab, click on the ***Histor***y tab.
10. Check the Status of the backup job. It will show Completed. The database has been successfully backed up and is ready for use by application users.

A.4.2 Backup Procedure for the CHART II Interim Archive Database

The backup procedures consist of configuring a backup job via the OEM. The job will run nightly. The following activities will be accomplished:

- CHART II Interim Archive Database Recovery Catalog Registration
- CHART II Interim Archive Database Backup Procedures

Parameters of the **Chart II Interim Archive database** backup implementation follow:

- Backup Type: Online. The database will be fully functional during the backups.
- Backup Time: 1:45 AM daily
- Backup Directory: d:\oracle\oradata\backup
- Format: the files will be compressed into 2 or more files in the backup directory. The Recovery Catalog is used for tracking backup activity.
- Database files being backed up consists of:

ARCH2RBSBIG01.DBF	C2ARCH2SYSTEM01.DBF	RCVCAT01.DBF
C2ARCH2_DATA01.DBF	CONTROL01.CTL	TEMP01.DBF
C2ARCH2_INDEX01.DBF	CONTROL02.CTL	USERS01.DBF
C2ARCH2_STATIC_DATA01.DBF	INDX01.DBF	<Archived redo logs>
C2ARCH2_STATIC_INDEX01.DBF	RBS01.DBF	

- Database files not being backed up consist of:
  - Online Redo Log Files. Oracle strongly recommends that these files should not be backed up.

A.4.2.1 Register the Database with the Recovery Catalog

The database must be registered with the Recovery Catalog database before the Backup job can be created. The following steps perform the registration task.

1. Logon to the Enterprise Manager Console on the Enterprise Manager workstation using the SYSMAN user id.
2. In the Navigator pane, double click on the Databases item to view the list of databases.
3. Click the right mouse button on the C2ARCH2 database. A pop-up menu appears.
4. Select ***Backup Management > Catalog Maintenance*** from the pop-up menu. The Catalog Maintenance window appears.
5. Click the ***Next*** button.
6. In the Operation Choice Page, choose ***Register Database***.
7. Click the ***Next*** button.
8. In the Configuration Page, ensure that you are using the CHARTII_BACKUP configuration.
9. Click the ***Next*** button.
10. In the Multiple Destinations Page, ensure the C2ARCH2 database is in the Selected Destinations list.
11. Click the ***Finish*** button. At this point, the database registration is sent as a job to the OEM Job system.
12. When the Summary screen appears, click ***OK*** to complete the operation.
13. In the Console, look in the Jobs Pane at the Status column of the first row. The status of the job will change from Scheduled to Started in a few seconds. Once the job task is completed, the job will disappear from the Active tab and reappear at the top of the History tab of the Job Pane.
14. Click on the ***History*** tab in the Jobs pane. The History tab will become active. Verify that the status of the first row is Completed (Not Failed). If the status of the Job is Failed, then the database may have already been registered with the catalog. To check this, perform the following:
    a) Double click on the failed row in the Job pane. The Edit Job property sheet appears.
    b) Double click on the Failed row in the list box. The Job Output property sheet appears.
    c) Look for "RMAN-20002" in the output window. This indicates that the database was already registered.
    d) Close the Job Output window.
    e) Close the Edit Job window.

A.4.2.2 Create a Backup Job Procedure

The following are the procedures for configuring the backup job of the Oracle database. These procedures create three items, (1) a backup job, (2) an SQL script to force the database to archive the current redo log, and (3) a TCL script to remove any archive logs for this database from the backup directory and copy the new archive log to the backup directory. The archive log will be needed for disaster recovery of the database.

1. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
2. In the General tab enter the following information:
    a) In the Job Name field, enter **`C2ARCH2_Backup`**
    b) In the Destination Type field, select ***Database*** from the drop down list.

c) Select ***C2ARCH2.CHART_DOM*** from the Available Destinations list box and click the ***Add*** button. C2ARCH2.CHART_DOM appears in the Selected Destinations list box.

d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.

3. In the Tasks tab page, select ***Backup*** in the Available Tasks list box and click the ***Add*** button. "Backup" appears in the Job Tasks list box.
4. Select ***Run SQL*Plus Script*** in the Available Tasks list box and click the ***Add*** button. "Run SQL*Plus Script" appears in the Job Tasks list box as the second item.
5. In the lower left corner of the Tasks tab page, select the ***Only on success of*** radio button. Backup will appear in the field to the right of the radio button, and the "Run SQL*Plus Script" text will be indented in the Job Tasks list box.
6. Select ***Run TCL Script*** in the Available Tasks list box and click the ***Add*** button. "Run TCL Script" appears in the Job Tasks list box as the third item.
7. In the lower left corner of the Tasks tab page, select the ***Only on success of*** radio button. Verify that Backup appears in the field to the right of the radio button. If it does not appear then click on the dropdown button and select it. When you are done, Backup will appear in the field to the right of the radio button, and the "Run TCL Script" text will be indented in the Job Tasks list box at the same level as the "Run SQL*Plus Script".
8. In the Parameters tab page, select ***Backup*** from the Selected Tasks list box. A Details button will appear.
9. Click on the ***Details*** button. The Backup Wizard window appears.
10. Click the ***Next*** button to accept the Predefined backup strategy. The Backup Wizard Backup Frequency window appears.
11. Select the second radio button for ***Full backup everyday***.
12. Click the ***Next*** button. The Backup Wizard Backup Time window appears.
13. Click the ***Next*** button to accept the default of 12 midnight. The Backup Wizard Configuration window appears.
14. Ensure that CHARTII_BACKUP is displayed in the "Choose the configuration for this backup" field. Select it from the drop down list, if necessary.
15. Click the ***Finish*** button. The Backup Wizard Configuration window closes returning you to the Parameters tab of the Create Job window.
16. Select the "Run SQL*Plus Script item from the Selected Tasks list box. The right side of the tab page changes.
17. Enter the following in the Script Text text box:

```
alter system archive log current;
alter database backup controlfile to
'd:\oracle\oradata\backup\c_c2arch2control.ctl' reuse;
```

18. Select the "Run TCL Script" item from the Selected Tasks list box. The right side of the tab page changes.
19. Enter the following in the TCL Script text box:

```
catch { rmfile d:\\oracle\\oradata\\backup\\C2ARCH2*.arc } output
puts $output
set output [exec copy
d:\\oracle\\oradata\\C2ARCH2\\archive\\*.arc
d:\\oracle\\oradata\\backup\\*.*]
```

```
puts $output
```

Note that the fourth and fifth lines in the above text is actually a single line of text, so make sure there are only five lines of text in the text box.

20. In the Schedule tab page perform the following:
    a) select the ***On Interval*** radio button.
    b) In the Time field, perform the following:
        – Select the hours portion of the time and enter 1
        – Select the minutes portion of the time and enter 45
        – If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.
    c) Select the ***every*** radio button at the bottom of the window
    d) In the Days field, enter 1.
21. Click the ***Submit&Add*** button. The Create Job window closes.
22. In the Job pane, note the addition of a new row representing the recently created backup job. This job will run at 1:45AM.

A.4.2.3 Immediate Backup Configuration

Perform the following steps to immediately run the Backup job in the Job library.

1. From the Enterprise Manager Console, select the Job Library item from the Job menu. The Job Library window will open.
2. Select the C2ARCH2_Backup item from the Job Name list box and click the ***Create Like*** button. The "Create Job" window appears.
3. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "C2ARCH2_Backup1".
4. In the Schedule tab, select the ***Immediately*** radio button.
5. Click the ***Submit*** button. The Create Job window closes returning you to the Job Library window.
6. Click the ***Close*** button. The Job Library window closes.
7. In the Job pane, note the addition of a new row with the name "C2ARCH2_Backup1". This job will run immediately and only once.
8. The Status column value for the backup job will change from submitted to scheduled to started. Finally the job will disappear from the Active tab and reappear on the History tab.
9. After the job disappears from the Active tab, click on the ***Histor***y tab.
10. Check the Status of the backup job. It will show Completed. The database has been successfully backed up and is ready for use by application users.

A.4.3 Backup Procedure for the OEM Database

The OEM stores its repository and the recovery log data in an Oracle database. Therefore, the OEM database needs to be backed up as well. The OEM database backup will be performed with the database open and fully accessible by application users.

The following activities will be accomplished:

- OEM Backup and Recovery Setup Procedures

- OEM Backup Procedures

Parameters of the **Enterprise Manager database** backup implementation follow:

- Backup Type: Online. The database will be fully functional during the backups.
- Backup Time: 3:30 AM daily
- Backup Directory: d:\oracle\oradata\backup
- Format: the files will be compressed into 2 or more files in the backup directory. The Recovery Catalog is used for tracking backup activity.
- Database files being backed up consists of:

CONTROL01.CTL	RCVCAT01.DBF	TEMP01.DBF
CONTROL02.CTL	RBS01.DBF	<Archived redo logs>
INDX01.DBF	USERS01.DBF	
OEMREP01.DBF	SYSTEM01.DBF	

- Database files not being backed up consist of:
  - Online Redo Log Files. Oracle strongly recommends that these files should not be backed up.

A.4.3.1 Setup Procedures

Following are the steps for configuring the Enterprise Manager server for backing up the Enterprise Manager database.

Create OEM Backup Configuration

1. Login to the OEM Console.
2. In the Navigator pane, double click on the Databases item to view the list of databases.
3. Click the right mouse button on the Enterprise Manager database. A pop-up menu appears.
4. Select ***Backup Management*** > ***Create Backup Configuration*** from the pop-up menu. The Create Backup Configuration window appears.
5. In the Name field enter **`OEM_CATALOG_BACKUP`**.
6. In the Description field enter **`Perform Hot backup of OEM database`**.
7. Click the ***Channels*** tab. In the Channel Name field enter **`Ddrive`**.
8. In the File Name field enter **`b_%d_%s_%t`**.

   The substitution variables in the backup file name are defined as follows:

   - %d – specifies the database name
   - %s – specifies the backup set number. This number is a counter in the control file that is incremented for each backup set. The counter value starts at 1 and is unique for the lifetime of the control file. If you restore a backup control file, then duplicate values can result.

- %t – specifies the backup set timestamp, which is a 4-byte value derived as the number of seconds elapsed since a fixed reference time. The combination of %s and %t can be used to form a unique name for the backup set.

9. In the Directory field enter **`d:\oracle\oradata\backup\`**.
10. Click the ***Recovery Catalog*** tab. Fill in the following information:
    - Select the ***In a recovery catalog*** radio button.
    - In the Username field, enter **`rmanchart2`**.
    - In the Password field, enter the appropriate password**.**
    - In the Service field, select ***c2arch2*** from the drop down list.
11. Click the ***Create*** button. A message box will appear indicating that the database is not registered in the recovery catalog.
12. Click the ***Register*** button. The message box and Create Backup Configuration window close.
13. In the Active tab of the Job pane, note the addition of a new row representing the recently created register job. The status for this job will change from submitted to scheduled to started. The job will disappear from the Active tab when the register job is complete.
14. Click on the History tab in the Jobs pane and verify that the status for the Job is completed.

Test Backup Configuration

1. In the Navigator pane, right click on the ***EMREP*** database. A pop-up menu appears.
2. Select ***Backup Management*** **>** ***Backup*** from the pop-up menu. The Backup Wizard Introduction window appears.
3. Click the ***Next*** button. The Backup Wizard Strategy choice window appears.
4. Select the ***Customize backup strategy*** radio button and click the ***Next*** button. The Backup Wizard Backup Selection window appears.
5. Verify that the ***Entire database*** radio button is selected and click the ***Finish*** button. The Summary window appears.
6. Click the ***OK*** button. The Summary window closes.
7. In the Active tab of the Job pane, note the addition of a new row representing the recently created backup job. The status for this job will change from submitted to scheduled to started. The job will disappear from the Active tab when the backup is complete.
8. Click on the History tab in the Jobs pane and verify that the status for the Job is completed.

Backup File Installation

1. From the Enterprise Manager database server, insert the CHART II database Installation floppy into the A: drive.
2. Using Explorer, navigate to the A: drive.
3. Double click on the ***Setup.exe*** file. The installation Welcome window appears.
4. Click the ***Next*** button. The “What do you want to Install?” window appears.
5. Click the ***Oracle Enterprise Manager Backup and Recovery Files*** radio button.

6. Click the ***Next*** button. The installation process begins. The following tasks are being performed.
   a) The Backup_Recovery directory is created under the D:\Oracle\ORA81\Database directory.
   b) The following files are copied into the new directory:

• recover_oem.bat	Runs Oracle's RMAN application and provides the recover_oem.rcv file as a command line parameter.
• recover_oem.rcv	Contains the recover script for Oracle's RMAN application.
• recover_oem_disaster.bat	Runs Oracle's RMAN application and provides the recover_oem_disaster.rcv file as a command line parameter.
• recover_oem_disaster.rcv	Contains the recover script for Oracle's RMAN application. This script will recover the database in the event the D: drive crashes.
• recover_oem_controlfile.bat	Runs Oracle's RMAN application and provides the recover_oem_controlfile.rcv file as a command line parameter.
• recover_oem_controlfile.rcv	Contains the recover script for Oracle's RMAN application. This script will recover the controlfile in the event the D: drive crashes. The control file must be restored before the database can be recovered.

7. The Information Complete message box will appear when the installation is complete.
8. Click the ***OK*** button. The Installation window closes.

A.4.3.2 OEM Backup Procedures

The following are the procedures for configuring the backup job of the OEM database. Verify that the Enterprise Manager database is in Archivelog mode before proceeding. These procedures create three items: (1) a backup job, (2) an SQL script to force the database to archive the current redo log, and (3) a TCL script to remove any archive logs for this database from the backup directory, to copy the new archive log to the backup directory, and to copy the control file to the backup directory with a new name. The archive log and control file will be needed for disaster recovery of the database. The control file that is contained in the last database backup can recover the previous database backup, but not the last database backup.

Create Backup Job

1. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
2. In the General tab enter the following information:
   a) In the Job Name field, enter **`EMREP_Backup`**
   b) In the Destination Type field, select ***Database*** from the drop down list.
   c) Select ***EMREP.CHART_DOM*** from the Available Destinations list box and click the ***Add*** button. EMREP.CHART_DOM appears in the Selected Destinations list box.
   d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.

3. In the Tasks tab page, select ***Backup*** in the Available Tasks list box and click the ***Add*** button. "Backup" appears in the Job Tasks list box.
4. Select ***Run SQL*Plus Script*** in the Available Tasks list box and click the ***Add*** button. "Run SQL*Plus Script" appears in the Job Tasks list box as the second item.
5. In the lower left corner of the Tasks tab page, select the ***Only on success*** of radio button. Backup will appear in the field to the right of the radio button, and the "Run SQL*Plus Script" text will be indented in the Job Tasks list box.
6. Select ***Run TCL Script*** in the Available Tasks list box and click the ***Add*** button. "Run TCL Script" appears in the Job Tasks list box as the third item.
7. In the lower left corner of the Tasks tab page, select the ***Only on success of*** radio button. Verify that Backup appears in the field to the right of the radio button. If it does not appear then click on the dropdown button and select it. When you are done, Backup will appear in the field to the right of the radio button, and the "Run TCL Script" text will be indented in the Job Tasks list box at the same level as the "Run SQL*Plus Script".
8. In the Parameters tab page, select ***Backup*** from the Selected Tasks list box. A Details button will appear.
9. Click on the ***Details*** button. The Backup Wizard window appears.
10. Click the ***Next*** button to accept the Predefined backup strategy. The Backup Wizard Backup Frequency window appears.
11. Select the second radio button for ***Full backup everyday***.
12. Click the ***Next*** button. The Backup Wizard Backup Time window appears.
13. Click the ***Next*** button to accept the default of 12 midnight. The Backup Wizard Configuration window appears.
14. Ensure that EMREP_CATALOG_BACKUP is displayed in the "Choose the configuration for this backup" field. Select it from the drop down list, if necessary.
15. Click the ***Finish*** button. The Backup Wizard Configuration window closes returning you to the Parameters tab of the Create Job window.
16. Select the "Run SQL*Plus Script item from the Selected Tasks list box. The right side of the tab page changes.
17. Enter the following in the Script Text text box:

```
alter system archive log current;
alter database backup controlfile to
'd:\oracle\oradata\backup\c_emrepcontrol.ctl' reuse;
```

18. Select the "Run TCL Script" item from the Selected Tasks list box. The right side of the tab page changes.
19. Enter the following in the TCL Script text box:

```
catch { rmfile d:\\oracle\\oradata\\backup\\emrep*.arc } output
puts $output
set output [exec copy d:\\oracle\\oradata\\EMREP\\archive\\*.arc
d:\\oracle\\oradata\\backup\\*.*]
puts $output
```

Note that the fourth and fifth lines in the above text are actually a single line of text. Also, the last two lines are actually one line, so make sure there are only six lines of text in the text box.

20. In the Schedule tab page perform the following:
    a) select the ***On Interval*** radio button.
    b) In the Time field, perform the following:
        – Select the hours portion of the time and enter 3
        – Select the minutes portion of the time and enter 30
        – If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.
    c) Select the ***every*** radio button at the bottom of the window
    d) In the Days field, enter 1.
21. Click the ***Submit&Add*** button. The Create Job window closes.
22. In the Job pane, note the addition of a new row representing the recently created backup job. This job will run at 3:30AM.

Immediate Backup Configuration

Perform the following steps immediately after installation of a new database or to test the scheduled backup.

1. From the Enterprise Manager Console, select the Job Library item from the Job menu. The Job Library window will open.
2. Select the ***EMREP_Backup*** item from the Job Name list box and click the ***Create Like*** button. The "Create Job" window appears.
3. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "EMREP_Backup1".
4. In the Schedule tab, select the ***Immediately*** radio button.
5. Click the ***Submit*** button. The Create Job window closes returning you to the Job Library window.
6. Click the ***Close*** button. The Job Library window closes.
7. In the Job pane, note the addition of a new row with the name "EMREP_Backup1". This job will run immediately and only once.
8. The Status column value for the backup job will change from submitted to scheduled to started. Finally the job will disappear from the Active tab and reappear on the History tab.
9. After the job disappears from the Active tab, click on the ***Histor***y tab.
10. Check the Status of the backup job. It will show Completed. The database has been successfully backed up.

A.4.4 Create CHART II Export Job

Exports of the static data will be performed periodically to capture any changes in the data resulting from operations. This export will take place daily as part of the full backup procedures. It will be a separate job executed via the Enterprise Manager job queue. This will allow reloading static tables, whenever there is a problem with a specific table, without having to do a full recovery of the database. The procedure for this job is below.

The following procedure configures a job that will export the CHART2 table data to a dump file called SOCEXPDAT.DMP. In the event that a table is accidentally dropped, this file can be used to quickly recreate the table and its associated data.

1. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
2. In the General tab page enter the following information:
   a) In the Job Name field, enter **`Export_SOC2`**
   b) In the Destination Type field, select ***Database*** from the drop down list.
   c) Select ***C2SOC2.CHART_DOM*** from the Available Destinations list box and click the ***Add*** button. C2SOC2.CHART_DOM appears in the Selected Destinations list box.
   d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
3. In the Tasks tab page, select ***Export*** in the Available Tasks list box and click the ***Add*** button. Export appears in the Job Tasks list box.
4. In the Parameters tab page, click the ***Details*** button. The Export Wizard window appears.
5. In the "File Name" column change the text to D:\ORACLE\ORADATA\BACKUP\SOCEXPDAT.DMP.
6. Click the ***Next*** button. The Export Type window appears.
7. Click the ***Table*** radio button and click the ***Next*** button. The Table Selection window appears.
8. Click the plus sign next to the CH2DBA user. The list of CHART II tables appears.
9. Select the CENTER table in the list and click the right arrow button to move the table to the Selected Tables list box. "CENTER" appears in the Selected Tables list box.
10. Repeat the previous step for each of the following tables in the list.

    CH2_DICTIONARY
    CODE_LIST
    CODE_LIST_ITEM
    DEVICE_CONFIGURATION
    DICTIONARY_WORD
    DMS
    DMS_FONT
    DMS_PHONE_NUMBER
    EQUIPMENT
    FUNCTIONAL_RIGHT
    MESSAGE_LIBRARY
    ORGANIZATION
    PLAN
    PLAN_ITEM
    PROFILE_PROPERTY
    RESOURCE_CATEGORY_TYPE
    RESOURCE_TYPE
    ROLE
    ROLE_ASSIGNMENT
    ROLE_FUNCTION
    STANDARD_LANE
    STANDARD_LANE_CONFIG
    STORED_MESSAGE
    SYSTEM_PROFILE
    TSS

TSS_PHONE_NUMBER
TSS_ZONE
TSS_ZONE_GROUP
USER_ID

11. Click the ***Next*** button. The Associated Objects window appears.
12. Deselect all check boxes, except the ***Rows of table data*** check box.
13. Click the ***Advanced*** button. The Export Wizard: Advanced Options window appears.
14. Perform the following:

- Select the ***Compute optimizer statistics when data is imported*** radio button.
- Check the ***Direct Path*** check box.
- Deselect the ***Generate Log File*** check box.

15. Click the ***Tuning*** tab.
16. Perform the following:
    a) Click the ***Exports read-consistent view of data*** radio button.
    b) Click the ***Do not merge extents for import*** radio button.
17. Click the ***OK*** button. The Export Wizard: Advanced Options window closes returning you to the Associated Objects window.
18. Click the ***Finish*** button. The Export Wizard window closes returning you to the Create Job window.
19. In the Schedule tab page, perform the following:
    a) Select the ***On Interval*** radio button in the Run Job group box.
    b) In the Time field in the upper right corner of the window, perform the following:
        – Select the hours portion of the time and enter **`2`**
        – Select the minutes portion of the time and enter **`30`**
        – If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.
    c) Select the ***every*** radio button at the bottom of the window so that the Days field label becomes enabled.
    d) In the Days field, enter **`1`**.
20. Click the ***Submit&Add*** button. The job appears in the Jobs pane.
21. From the Job menu, select ***Job Library***. The Job Library window appears.
22. Select ***Export_SOC2*** from the list of Jobs and click the ***Edit*** button. The Create Job window appears.
23. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "Export_SOC21".
24. In the Schedule tab page, select the ***Immediately*** radio button and click the ***Submit*** button.
25. Click the ***Close*** button on the Job Library window.
26. The job appears in the Jobs Pane briefly, then disappears.

27. Using Explorer, navigate to the **d:\oracle\oradata\backup** directory and verify that the **SOCEXPDAT.DMP** file exists. If it does not exist, perform the following:
    - repeat steps 21 through 24,
    - click on the Parameters tab,
    - and verify that the Export File value specifies a directory that exists.

A.4.5 Create CHART II DLT Tape Backup Job

The following procedure configures a job that will backup the contents of the HANOVERCHART1 d:\oracle\oradata\backup directory to the network attached DLT tape backup unit.

1. Insert the CHARTII TCL Maintenance Program disk into the Enterprise Manager workstation A: drive.
2. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
3. In the General tab page enter the following information:
    a) In the Job Name field, enter **CHARTII DLT Tape Backup**
    b) In the Destination Type field, select ***Node*** from the drop down list.
    c) Select ***HANOVERCHART1*** from the Available Destinations list box and click the ***Add*** button. HANOVERCHART1 appears in the Selected Destinations list box.
    d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
4. In the Tasks tab page, select ***Run TCL Script*** in the Available Tasks list box and click the ***Add*** button. "Run TCL Script" appears in the Job Tasks list box.
5. Using Explorer, navigate to the A: drive.
6. Double click on the **DAT_Tape_Backup.txt** file. It will open in Notepad.
7. Select **Edit…Select All** from the menu.
8. Select **Edit…Copy** from the menu.
9. Close Notepad. The Notepad window closes returning you to the Create Job window.
10. In the Parameters tab page, click in the TCL Script text box.
11. Press the ***[ctrl]*** and ***v*** keys simultaneously. The copied text will be pasted into the text box.
12. In the Schedule tab page, perform the following:
    a) Select the ***On Interval*** radio button in the Run Job group box.
    b) In the Time field in the upper right corner of the window, perform the following:
        – Select the hours portion of the time and enter **3**
        – Select the minutes portion of the time and enter **00**
        – If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.
    c) Select the ***every*** radio button at the bottom of the window so that the Days field label becomes enabled.
    d) In the Days field, enter **1**.
13. Click the ***Submit&Add*** button. The job appears in the Jobs pane.

14. From the Job menu, select ***Job Library***. The Job Library window appears.
15. Select **`CHARTII DLT Tape Backup`** from the list of Jobs and click the ***Edit*** button. The Create Job window appears.
16. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "CHARTII DLT Tape Backup1".
17. In the Schedule tab page, select the ***Immediately*** radio button and click the ***Submit*** button.
18. Click the ***Close*** button on the Job Library window.
19. The job appears in the Jobs Pane briefly, then disappears.
20. Click on the History tab of the Jobs pane.
21. Look at the **`CHARTII DLT Tape Backup1`** job. If the status is completed, then the job was successful.

A.4.6 Remove Aged Files

The following maintenance TCL scripts automate the removal of aged backup files.

A.4.6.1 Remove Aged CHARTII Database Backup Files

The following procedure configures a job that removes aged database backup files from the HANOVERCHART1 d:\oracle\oradata\backup directory.

1. Insert the CHARTII TCL Maintenance Program disk into the Enterprise Manager workstation A: drive.
2. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
3. In the General tab page enter the following information:
   a) In the Job Name field, enter **`Remove_R1B2_Aged_Backupsets`**
   b) In the Destination Type field, select ***Node*** from the drop down list.
   c) Select ***HANOVERCHART1*** from the Available Destinations list box and click the ***Add*** button. HANOVERCHART1 appears in the Selected Destinations list box.
   d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
4. In the Tasks tab page, select ***Run TCL Script*** in the Available Tasks list box and click the ***Add*** button. "Run TCL Script" appears in the Job Tasks list box.
5. Using Explorer, navigate to the A: drive.
6. Double click on the **Remove_R1B2_Aged_Backupsets.txt** file. It will open in Notepad.
7. Select **Edit…Select All** from the menu.
8. Select **Edit…Copy** from the menu.
9. Close Notepad. The Notepad window closes returning you to the Create Job window.
10. In the Parameters tab page, click in the TCL Script text box
11. Press the ***[ctrl]*** and ***v*** keys simultaneously. The copied text will be pasted into the text box.
12. In the Schedule tab page, perform the following:
    a) Select the ***On Interval*** radio button in the Run Job group box.
    b) In the Time field in the upper right corner of the window, perform the following:
       – Select the hours portion of the time and enter **`2`**

- Select the minutes portion of the time and enter **45**
- If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.

c) Select the ***every*** radio button at the bottom of the window so that the Days field label becomes enabled.

d) In the Days field, enter **1**.

13. Click the ***Submit&Add*** button. The job appears in the Jobs pane.
14. From the Job menu, select ***Job Library***. The Job Library window appears.
15. Select **Remove_R1B2_Aged_Backupsets** from the list of Jobs and click the ***Create Like*** button. The Create Job window appears.
16. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "Remove_R1B2_Aged_Backupsets1".
17. In the Schedule tab page, select the ***Immediately*** radio button and click the ***Submit*** button.
18. Click the ***Close*** button on the Job Library window.
19. The job appears in the Jobs Pane briefly, then disappears.
20. Click on the History tab of the Jobs pane.
21. Look at the **Remove_R1B2_Aged_Backupsets1** job. If the status is completed, then the job was successful.

A.4.6.2 Remove Aged Enterprise Manager Database Backup Files

The following procedure configures a job that removes aged database backup files from the HC026561 workstation d:\oracle\oradata\backup directory, copies the existing files from the backup directory to a network share drive, and removes aged database backup files from the network share drive.

1. Insert the CHARTII TCL Maintenance Program disk into the Enterprise Manager workstation A: drive.
2. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
3. In the General tab page enter the following information:
   a) In the Job Name field, enter **Remove_EMREP_Aged_Backupsets**
   b) In the Destination Type field, select ***Node*** from the drop down list.
   c) Select ***HC026561*** from the Available Destinations list box and click the ***Add*** button. HC026561 appears in the Selected Destinations list box.
   d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
4. In the Tasks tab page, select ***Run TCL Script*** in the Available Tasks list box and click the ***Add*** button. "Run TCL Script" appears in the Job Tasks list box.
5. Using Explorer, navigate to the A: drive.
6. Double click on the **Remove_EMREP_Aged_Backupsets.txt** file. It will open in Notepad.
7. Select **Edit…Select All** from the menu.
8. Select **Edit…Copy** from the menu.
9. Close Notepad. The Notepad window closes returning you to the Create Job window.
10. In the Parameters tab page, click in the TCL Script text box

11. Press the ***[ctrl]*** and ***v*** keys simultaneously. The copied text will be pasted into the text box.
12. In the Schedule tab page, perform the following:
    a) Select the ***On Interval*** radio button in the Run Job group box.
    b) In the Time field in the upper right corner of the window, perform the following:
        – Select the hours portion of the time and enter **3**
        – Select the minutes portion of the time and enter **45**
        – If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.
    c) Select the ***every*** radio button at the bottom of the window so that the Days field label becomes enabled.
    d) In the Days field, enter **1**.
13. Click the ***Submit&Add*** button. The job appears in the Jobs pane.
14. From the Job menu, select ***Job Library***. The Job Library window appears.
15. Select **Remove_EMREP_Aged_Backupsets** from the list of Jobs and click the ***Create Like*** button. The Create Job window appears.
16. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "Remove_EMREP_Aged_Backupsets1".
17. In the Schedule tab page, select the ***Immediately*** radio button and click the ***Submit*** button.
18. Click the ***Close*** button on the Job Library window.
19. The job appears in the Jobs Pane briefly, then disappears.
20. Click on the History tab of the Jobs pane.
21. Look at the **Remove_EMREP_Aged_Backupsets1** job. If the status is completed, then the job was successful.

A.4.6.3 Remove Aged CHARTII Log Files

Two procedures are included in this section. The first procedure configures a job that will remove aged CHARTII DMS Status log files from the HANOVERCHART1 hard drive. The second procedure modifies the number of days to keep the log files before purging them. The value is initially set at 14 days.

Create Job

1. Insert the CHARTII TCL Maintenance Program disk into the Enterprise Manager workstation A: drive.
2. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
3. In the General tab page enter the following information:
    a) In the Job Name field, enter **Remove_Aged_Logfiles**
    b) In the Destination Type field, select ***Node*** from the drop down list.
    c) Select ***HANOVERCHART1*** from the Available Destinations list box and click the ***Add*** button. HANOVERCHART1 appears in the Selected Destinations list box.
    d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.

4. In the Tasks tab page, select ***Run TCL Script*** in the Available Tasks list box and click the ***Add*** button. "Run TCL Script" appears in the Job Tasks list box.
5. Using Explorer, navigate to the A: drive.
6. Double click on the **Remove_Aged_Logfiles.txt** file. It will open in Notepad.
7. Select **Edit…Select All** from the menu.
8. Select **Edit…Copy** from the menu.
9. Close Notepad. The Notepad window closes returning you to the Create Job window.
10. In the Parameters tab page, click in the TCL Script text box
11. Press the ***[ctrl]*** and ***v*** keys simultaneously. The copied text will be pasted into the text box.
12. In the Schedule tab page, perform the following:
    a) Select the ***On Interval*** radio button in the Run Job group box.
    b) In the Time field in the upper right corner of the window, perform the following:
       – Select the hours portion of the time and enter **3**
       – Select the minutes portion of the time and enter **15**
       – If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.
    c) Select the ***every*** radio button at the bottom of the window so that the Days field label becomes enabled.
    d) In the Days field, enter **1**.
13. Click the ***Submit&Add*** button. The job appears in the Jobs pane.
14. From the Job menu, select ***Job Library***. The Job Library window appears.
15. Select **Remove_Aged_Logfiles** from the list of Jobs and click the ***Create Like*** button. The Create Job window appears.
16. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "Remove_Aged_Logfiles1".
17. In the Schedule tab page, select the ***Immediately*** radio button and click the ***Submit*** button.
18. Click the ***Close*** button on the Job Library window.
19. The job appears in the Jobs Pane briefly, then disappears.
20. Click on the History tab of the Jobs pane.
21. Look at the **Remove_Aged_Logfiles1** job. If the status is completed, then the job was successful.

Modify Purge Number of Days Parameter

Changing the parameter value requires the user to delete the Remove_Aged_Logfiles job, edit it in the job library, and resubmit it.

22. From the Enterprise Manager Console, select the **Remove_Aged_Logfiles** item from the Active tab of the Job pane.
23. Select **Remove Job** from the Job menu. The Job disappears from the Job pane.
24. Select ***Job Library*** from the Job menu. The Job Library window appears.
25. Select **Remove_Aged_Logfiles** from the list of Jobs and click the ***Edit*** button. The Edit Job window appears.
26. Resize the Edit Job window so that it is as wide as the screen.

27. In the lower left hand corner of the window, select the **Submit & Save to Library** radio button.
28. In the Parameters tab page, scroll to the bottom of the TCL Script text box. Locate the following line: "set NumberOfDaysToKeepLogfile 14".
29. Change "14" to the desired number and click the ***OK*** button. The Edit Job window closes returning you to the Job Library window.
30. Click the ***Close*** button. The Job Library window closes returning you to the Oracle Enterprise Manager Console.
31. In the Active tab of the Job pane, note the addition of a new row representing the resubmitted job.

A.4.6.4 Process CHARTII TSS Raw Data Files

Two procedures are included in this section. The first procedure configures a job that will remove aged CHARTII TSS Raw Data files from the HANOVERCHART1 hard drive. The second procedure provides a list of parameters for configuring the job.

Create Backup Directory

1. Using Explorer, access the Oracle share directory on the HANOVERCHART1 server.
2. Navigate to the Oracle\Oradata\Backup directory.
3. Create a directory called: **TSSRawData**. The TSS files will be copied to this location for backup to tape.
4. Using Explorer, navigate to the Oracle directory
5. Create a directory called: **WebServerData**. This directory will serve as the WebServer share directory.

Create Job

6. Insert the CHARTII TCL Maintenance Program disk into the Enterprise Manager workstation A: drive.
7. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
8. In the General tab page enter the following information:
   a) In the Job Name field, enter **`Process_TSS_RawData_files`**
   b) In the Destination Type field, select ***Node*** from the drop down list.
   c) Select ***HANOVERCHART1*** from the Available Destinations list box and click the ***Add*** button. HANOVERCHART1 appears in the Selected Destinations list box.
   d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
9. In the Tasks tab page, select ***Run TCL Script*** in the Available Tasks list box and click the ***Add*** button. "Run TCL Script" appears in the Job Tasks list box.
10. Using Explorer, navigate to the A: drive.
11. Double click on the **Process_TSS_RawData_files.txt** file. It will open in Notepad.
12. Select **Edit…Select All** from the menu.
13. Select **Edit…Copy** from the menu.
14. Close Notepad. The Notepad window closes returning you to the Create Job window.
15. In the Parameters tab page, click in the TCL Script text box

16. Press the ***[ctrl]*** and ***v*** keys simultaneously. The copied text will be pasted into the text box.
17. In the Schedule tab page, perform the following:
    e) Select the ***On Interval*** radio button in the Run Job group box.
    f) In the Time field in the upper right corner of the window, perform the following:
        – Select the hours portion of the time and enter **12**
        – Select the minutes portion of the time and enter **45**
        – If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.
    g) Select the ***every*** radio button at the bottom of the window so that the Days field label becomes enabled.
    h) In the Days field, enter **1**.
18. Click the ***Submit&Add*** button. The job appears in the Jobs pane.
19. From the Job menu, select ***Job Library***. The Job Library window appears.
20. Select **Process_TSS_RawData_files** from the list of Jobs and click the ***Create Like*** button. The Create Job window appears.
21. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "Process_TSS_RawData_files1".
22. In the Schedule tab page, select the ***Immediately*** radio button and click the ***Submit*** button.
23. Click the ***Close*** button on the Job Library window.
24. The job appears in the Jobs Pane briefly, then disappears.
25. Click on the History tab of the Jobs pane.
26. Look at the **Process_TSS_RawData_files1** job. If the status is completed, then the job was successful.

Modify Parameters

Changing the parameter value requires the user to delete the Process_TSS_RawData_files job, edit it in the job library, and resubmit it.

27. From the Enterprise Manager Console, select the **Process_TSS_RawData_files** item from the Active tab of the Job pane.
28. Select **Remove Job** from the Job menu. The Job disappears from the Job pane.
29. Select ***Job Library*** from the Job menu. The Job Library window appears.
30. Select **Process_TSS_RawData_files** from the list of Jobs and click the ***Edit*** button. The Edit Job window appears.
31. Resize the Edit Job window so that it is as wide as the screen.
32. In the lower left hand corner of the window, select the **Submit & Save to Library** radio button.
33. In the Parameters tab page, scroll to the bottom of the TCL Script text box. There are two modifiable parameters:
    - NumberOfDaysToKeepLogfile
    - WebServerDirectory
34. To change the Number of days to keep a log file, locate the following line: "set NumberOfDaysToKeepLogfile 7".

35. Change “14” to the desired number.
36. Similarly, to change the WebServerDirectory location, locate the line that begins: "set WebServerDirectory …".
37. Change the directory to the desired value. Make sure that the directory exists.
38. Click the ***OK*** button. The Edit Job window closes returning you to the Job Library window.
39. Click the ***Close*** button. The Job Library window closes returning you to the Oracle Enterprise Manager Console.
40. In the Active tab of the Job pane, note the addition of a new row representing the resubmitted job.

A.4.7 Create Daily Report

The following procedure creates a job that will generate a tab delimited report in the D:\ORACLE\ADMIN\C2SOC2\REPORTS directory on the database server.

1. From the Enterprise Manager Console, select the Create Job item from the Job menu. The Create Job window will open.
2. In the General tab page enter the following information:
   a) In the Job Name field, enter **`COMM_FAILURE_LOG_REPORT`**
   b) In the Destination Type field, select ***Database*** from the drop down list.
   c) Select ***C2SOC2*** from the Available Destinations list box and click the ***Add*** button. C2SOC2 appears in the Selected Destinations list box.
   d) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
3. In the Tasks tab page, select ***Run SQL*Plus Script*** in the Available Tasks list box and click the ***Add*** button. “Run SQL*Plus Script” appears in the Job Tasks list box.
4. Using Explorer, navigate to the D:\ORACLE\ADMIN\C2SOC2\REPORTS directory on the database server.
5. Double click on the **Comm_failure_log_daily_report.sql** file. It will open in Notepad.
6. Select **Edit…Select All** from the menu.
7. Select **Edit…Copy** from the menu.
8. Close Notepad. The Notepad window closes returning you to the Create Job window.
9. In the Parameters tab page, click in the “Script Text” field.
10. Press the ***[ctrl]*** and ***v*** keys simultaneously. The copied text will be pasted into the text box.
11. Scroll to the bottom of the inserted text. Locate the following line:

    “modem.type_code = log.port_type”

    Change “port_type” to “modem_response_code”
12. Scroll to the bottom of the inserted text. Locate the following line:

    “modem.type_code = log.port_type”

    Change “port_type” to “modem_response_code”
13. In the Schedule tab page, perform the following:
    a) Select the ***On Interval*** radio button in the Run Job group box.
    b) In the Time field in the upper right corner of the window, perform the following:
       – Select the hours portion of the time and enter **`12`**

- Select the minutes portion of the time and enter **`30`**
- If the time is set for PM, select the PM portion of the time and use the up arrow on the right edge of the field to change it to AM.

c) Select the ***every*** radio button at the bottom of the window so that the Days field label becomes enabled.

d) In the Days field, enter **`1`**.

14. Click the ***Submit&Add*** button. The job appears in the Jobs pane.
15. From the Job menu, select ***Job Library***. The Job Library window appears.
16. Select **COMM_FAILURE_LOG_REPORT** from the list of Jobs and click the ***Create Like*** button. The Create Job window appears.
17. In the General tab page, add a "1" to the contents of the Job Name field so that it reads "COMM_FAILURE_LOG_REPORT1".
18. In the Schedule tab page, select the ***Immediately*** radio button and click the ***Submit*** button.
19. Click the ***Close*** button on the Job Library window.
20. The job appears in the Jobs Pane briefly, then disappears.
21. Click on the History tab of the Jobs pane.
22. Look at the **COMM_FAILURE_LOG_REPORT1** job. If the status is completed, then the job was successful.

A.4.8 Setup Enterprise Manager Events

The following procedure configures events that will monitor the database status and performance. Section 3.9.3.1, Events provides a description of the events. The databases and servers are monitored once every 5 minutes.

1. Login to the OEM Console.
2. Select ***Event > Create Event…*** from the menu. The Create Event window will open.
3. In the General tab enter the following information:
   a) In the Job Name field, enter **`Monitor C2SOC2`**.
   b) In the Destination Type field, select ***Database*** from the drop down list.
   c) In the Frequency field, enter **`300`**.
   d) Select ***C2SOC2.CHART_DOM*** from the Available Destinations list box and click the ***Add*** button. C2SOC2.CHART_DOM appears in the Monitored Destinations list box.
   e) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
4. In the Tests tab, double click on each of the following items in the Available Tests list box:
   a) Alert
   b) Probe
   c) Buffer Cache
   d) Database UpDown
   e) Data Dictionary Cache
   f) In Memory Sorts
   g) Node UpDown
   h) Redo Log Allocation

i) Rollback Contention

Each of the above items will appear in the Selected Tests list box.

5. In the Parameters tab, select the **Rollback Contention** item in the Selected Tests list box.
6. In the list box on the right side of the window, click on the value for Warning threshold (%) and set it to .5.
7. Click the ***Submit&Add*** button. The Create Event window closes returning you to the Enterprise Manager Console.
8. In the Events list box, click on the **Registered** tab. The "Monitor C2SOC2" event should appear with a status of Registering. Eventually the status will change to Registered.
9. Select ***Event > Create Event…*** from the menu. The Create Event window will open.
10. In the General tab enter the following information:
    a) In the Job Name field, enter **`Monitor C2ARCH2`**
    b) In the Destination Type field, select ***Database*** from the drop down list.
    c) Select ***C2ARCH2.CHART_DOM*** from the Available Destinations list box and click the ***Add*** button. C2ARCH2.CHART_DOM appears in the Monitored Destinations list box.
11. In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
12. Repeat steps 4 through 7 above.
13. In the Events list box, look at the **Registered** tab. The "Monitor C2ARCH2" event should appear with a status of Registering. Eventually the status will change to Registered.
14. Select ***Event > Create Event…*** from the menu. The Create Event window will open.
15. In the General tab enter the following information:
    a) In the Job Name field, enter **`Monitor C2ARCH2 Jobs`**
    b) In the Destination Type field, select ***Database*** from the drop down list.
    c) In the Frequency field, change **Sec.** to **Min.**
    d) Select ***C2ARCH2.CHART_DOM*** from the Available Destinations list box and click the ***Add*** button. C2ARCH2.CHART_DOM appears in the Monitored Destinations list box.
    e) In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
16. In the Tests tab, double click on each of the following items in the Available Tests list box:
    a) Broken Jobs
    b) Failed Jobs

    Each of the above items will appear in the Selected Tests list box.
17. In the Parameters tab, select the **Broken Jobs** item in the Selected Tests list box.
18. In the list box on the right side of the window, click on the value for Alert threshold (jobs) and set it to 1.
19. Select the **Failed Jobs** item in the Selected Tests list box.
20. In the list box on the right side of the window, click on the value for Alert threshold (jobs) and set it to 1.
21. Click the ***Submit&Add*** button. The Create Event window closes returning you to the Enterprise Manager Console.
22. In the Events list box, click on the **Registered** tab. The "Monitor C2ARCH2 Jobs" event should appear with a status of Registering. Eventually the status will change to Registered.
23. Select ***Event > Create Event…*** from the menu. The Create Event window will open.

24. In the General tab enter the following information:
    a) In the Job Name field, enter **`Monitor EMREP`**
    b) In the Destination Type field, select ***Database*** from the drop down list.
    c) Select ***EMREP.CHART_DOM*** from the Available Destinations list box and click the ***Add*** button. C2ARCH2.CHART_DOM appears in the Monitored Destinations list box.
25. In the lower left corner of the window, select the ***Submit & Add to Library*** radio button.
26. Repeat steps 4 through 7 above.
27. In the Events list box, look at the **Registered** tab. The "Monitor EMREP" event should appear with a status of Registering. Eventually the status will change to Registered.

Appendix B – Known Problems

The table below lists known problems and suggested workarounds for CHART II R1B2.

Indication of Problem	Problem Description	Suggested Workaround
"CORBA comm failure" error message	"CORBA comm failure" message is received.	Retry the action that caused this error. If the error persists it may indicate that a server is down. Notify the system administrator.
"Device communications timeout"	A command to a device generates a "Device communications timeout" message.	The device has not responded within the "Device Timeout Response" time period. Retry the action that caused this error. If the error persists it may indicate a problem with the device itself.
GUI freeze	GUI freezes and will not respond to mouse input.	Use the Windows NT Task manager to end the program and restart the GUI.

Appendix C – Server Installation Form

This form may be used to record information needed for CHART server installations.

Data Item	Value	Description
Operations Center		The name of the operations center that is to be assigned to the server
Host Name		The host name of the computer that is running the Oracle database
Database Instance		The name of the database instance on the system specified by Host Name
Port Number		The port number being used by the Database Instance
User Management Service User Name		Database user name for the CHART II User Management Service
User Management Service Password		Database password for the CHART II User Management Service
CHART II DMS Service User Name		Database user name for the CHART II DMS Service
CHART II DMS Service Password		Database password for the CHART II DMS Service
CHART II Message Utility Service User Name		Database user name for the CHART II Message Utility Service
CHART II Message Utility Service Password		Database password for the CHART II Message Utility Service
CHART II Traffic Event Service User Name		Database user name for the CHART II Traffic Event Service
CHART II Traffic Event Service Password		Database password for the CHART II Traffic Event Service

Appendix D – DMS Installation Form

This form may be used to record information needed in order to add a new DMS to the system.

Data Item	Value	Description
Sign Name		The name of the sign as denoted by its assigned number.
Sign Type		The type of sign display. One of Char/Full/Line/Other.
Location		Text description of the location of the sign.
Organization		The owning organization for the sign.
Model ID		The model ID of the sign.
Sign Height (characters)		Vertical sign display dimension in characters.
Sign Width(characters)		Horizontal sign display dimension in characters.
Character Height (pixels)		Vertical dimension of a character cell in pixels.
Character Width(pixels)		Horizontal dimension of a character cell in pixels.
Beacon Support		Whether or not the sign has beacons.
Default Line Justification		Indicates default position of message on sign. One of Center/Left/Right.
Max Pages		The maximum number of pages this sign will display.
Default Page On Time (if supported)		The default time in seconds that the message will display on a page.
Default Page Off Time (if supported)		The default time in seconds that the page will remain blank between refreshes of the display.
Drop Address		The multi-drop address for which the sign controller has been configured to respond to.
Phone #		The default phone number for the sign. This should always be entered as the complete 10 digit number (plus prefix and long distance digit as

Data Item	Value	Description
		needed) required to dial the device. This number will be used to pre-fill the phone number field in the Port Manager panel.
Poll Interval		The frequency (in hours and minutes) to poll the sign for status information.
Polling Enabled		Whether polling of this device is enabled or not.
Timeout		The time period (in seconds) within which a port must be allocated by the port manager or the operation will timeout.
Port Managers		The names of the port managers that will support communications with this device.
Connection type		Whether this device has an ISDN or POTS modem
Phone number to use for each port manager		The phone number to use from each port manager configured to serve this device.
Modem parameters		The baud rate, flow control, number of data bits, parity, and number of stop bits to use when communicating with this device.

Appendix E – System Status and Error Messages

This section provides a list of those system status and error messages that may require some action by a user. The table below provides a list of the messages, an explanation of the message, and recommended user action.

The strings enclosed in brackets are replaced with appropriate information when the message is logged. For example [DMS Name] is replaced with the name of the DMS.

Message	Explanation	User Action
(CHART2Exception) [operation description] SW problem: General connect failure [description].	Unexpected error attempted to dial out to sign. Additional details provided in [description]. No further attempts will be made. Possible values of [description]: • "Port '" + m_name + ": Failure setting the serial port parameters." Problem setting baud rate, data bits, stop bits, parity, flow control. Indicative of a software error, no bad values should ever be allowed to get this far. • There may be others	Contact software support.
(ConnectFailure) [operation description] Could not connect to port [description].	A general (unexpected) connection failure described by e.reason. No further attempts will be made.	Contact software support.
(ModemConnectFailure) [operation description] Could not connect to port [port name], modem connect failure: Modem cmd: [modem command] , response code: [response code].	An error occurred actually trying to dial and complete the connection to the modem of the field device. Details are provided. Response codes which can be reported are: • NO DIAL TONE: Modem may not be connected to the phone line, or phone line is not in service. Will retry another port.	In the case of a failed call with no automatic retries the operation should be manually retried.

Message	Explanation	User Action
	• NO CARRIER: Modem failure. Will retry another port. • ERROR: General error with the modem. Will retry another port. • UNKNOWN: Unexpected error with the modem. Port will marked (internally by the system) as marginal and will not be used for any communications again unless marginal ports are the only ones left. Will retry another port. • NO ANSWER: The call was successfully dialed but the remote modem did not answer. Device may be off, disconnected, or malfunctioning, or the phone number may be incorrect. No more retries will be attempted. • BUSY: The call was successfully dialed but the remote modem did not answer. If running with multiple DMS Services, device could be in communication with another DMS Service. Otherwise, the device may be off, disconnected, or malfunctioning, or the phone number may be incorrect. No more retries will be attempted.	

Message	Explanation	User Action
(ModemInitFailure) [operation description] Could not connect to port [port name], modem init failure: Modem cmd: [modem command] , response code: [response code].	The modem at the local (CHART II) end cannot be initialized. Port will marked (internally by the system) as marginal and will not be used for any communications again unless marginal ports are the only ones left. Meanwhile, for this call, the system will automatically attempt to use next PortManager (if there are any more).	None required.
(ModemNotResponding) [operation description] Could not connect to port [port name], modem not responding: [description].	The modem at the local (CHART II) end is not responding. It may be off, disconnected, or malfunctioning. Port will be marked (internally by the system) as marginal and will not be used for any communications again unless marginal ports are the only ones left. The system will automatically attempt to use next PortManager (if there are any more).	None required.
(PortOpenFailure) [operation description] Could not connect to port [port name], could not open port: [description].	The port on the PortManager computer where the CHART II modem is supposed to be cannot be opened. It may not exist, have no modem on it, or be disabled. Port will marked (internally by the system) as marginal and will not be used for any communications again unless marginal ports are the only ones left. Meanwhile, for this call, the system will automatically attempt to use next PortManager (if there are any more).	Possible PortManager configuration problem. Check the configuration for this PortManager.
[description] failed (SW problem): [description].	Could not complete the specified operation for the reason provided in	Contact software support.

Message	Explanation	User Action
	[description]. This is a software problem of some sort, an unexpected error occurred.	
[description] could not set Comm Loss timeout on sign: SW problem, Protocol Handler confusion.	(FP9500 only) A bizarre software problem, attempting to communicate with what is thought to be an FP9500, but the ProtocolHandler is not an FP9500ProtocolHandler.	Contact software support.
[description] could not set Comm Loss timeout on sign: SW problem, [description].	Could not set comm loss timeout on device for the reason provided in [description]. This is a software problem of some sort, an unexpected error occurred.	Contact software support.
[description] could not set Comm Loss timeout on sign: SW problem, port not a DataPort.	(FP9500 only) Could not set comm loss timeout on device. This is a bizarre software problem, where the Port being used is not a DataPort capable of transmitting data.	Verify the device and PortManager configuration and retry the operation.
[description] could not set Comm Loss timeout on sign: [description].	(FP9500 only) Could not set comm loss timeout on device for the reason provided. The device is using a new protocol, or there are line or communication problems.	Verify the device configuration and retry the operation.
[description] failed: [description].	Could not complete specified operation for the reason provided. The device is using a new protocol, or there are line or communication problems.	Verify the device configuration and retry the operation.
[description] failed: SW problem, [DMS name] , port not a DataPort.	Could not complete the specified operation. This is a bizarre software problem,	Verify the device and PortManager configuration and retry the operation.

Message	Explanation	User Action
	where the Port being used is not a DataPort capable of transmitting data.	
[description] failed: SW problem, [DMS name] , Protocol Handler confusion.	(FP9500 and TS3001 only) A bizarre software problem, attempting to communicate with what is thought to be an FP9500, but the ProtocolHandler is not an FP9500ProtocolHandler.	Contact software support.
[description] partial failure: Message set but could not set beacons: [description].	(FP9500 only) Message was set but beacons could not be set.	Retry the operation.
[DMS name] blank and reset failed.	Successfully contacted sign, but could not blank it or reset it.	Line may have been disconnected, or else indicates problem it sign, most likely.
[DMS name] blanked, reset failed.	Successfully contacted sign and blanked it prior to reset, but the reset itself failed.	Line may have been disconnected, or else indicates problem in sign, most likely.
[DMS name] is already in [mode] mode.	DMS received a request to go into the mode it is already in. Indicates a software error, GUI should not allow attempt to be made.	Contact software support.
[DMS name] is in [mode] mode. Must be in [mode] mode to [description] .	DMS received a request to do something it cannot do in the current mode. Indicates a software error, GUI should not allow attempt to be made.	Contact software support.
[DMS name] now reads: [description]. WARNING: beacon failure, but beacons were ([ON : OFF]) anyway.	Successfully set the message on the sign, but could not change the beacons - but they were already what was requested.	Hardware problem with beacons. This is reported as a success, as the desired end result was achieved.
[DMS name] now reads:[description]. WARNING: beacon failure, beacons now ([ON : OFF]) .	Successfully set the message on the sign, but could not change the beacons - they are now opposite to what was requested.	Hardware problem with beacons.
[DMS name] put in maint mode (blank FAILED).	The DMS was put in maintenance mode, but the blank operation failed. This is	none

Message	Explanation	User Action
	reported as a success, as the desired end result (getting into maintenance mode) was achieved.	
[DMS name] reset, but blank failed.	Successfully contacted sign, could not blank it, but the reset works.	This almost certainly indicates a hardware problem with the sign, as the connection is seen to have been maintained by virtue of the successful reset of the sign after the blank failed. This is reported as a success, as the desired end result was achieved.
[operation description] [PortManager name] not found in trader.	PortManager is not running, has never contacted (or has been removed from) trader.	Remove this PortManager from the list (Field Comms tab of DMS props) and specify a different one. Meanwhile, the system will automatically attempt to use next PortManager (if there are any more).
[operation description] SW problem: Could not connect to port, it is not a modem port.	Cannot dial, the port acquired is not a capable of dialing. This is a severe, bizarre, unexpected problem. No further attempts will be made.	Contact software support.
[operation description] SW problem: General port connect failure [description].	Unexpected software error attempting to connect on the specified modem port. No more retries will be attempted.	Contact software support.
Cannot poll DMS: DMS is offline.	DMS received a request to poll the device when it is offline. Indicates a software error, GUI should not allow attempt to be made.	Contact software support.
Can't [description] : DMS controlled by [op center name] , you're from [op center name].	An attempt was made to take control of a sign from another op center without override authority. This can happen legitimately if two users from different op centers attempt to control an uncontrolled sign at the same time. The second one in will get this message.	None required.
Can't [description] : invalid	A user's "token" could not be	Contact software support.

Message	Explanation	User Action
user token (SW problem).	read in order to validate authority to perform the specified operation. Indicative of a software problem - users have no visibility or control over their own tokens.	
Can't [description] : Invalid user token (system error).	A user's "token" could not be read in order to validate authority to perform the specified operation. Indicative of a software problem - users have no visibility or control over their own tokens.	Contact software support.
Can't [description] : System error while checking for resource conflict.	An unexpected system software problem was encountered attempting to validate a user's authority to perform the specified operation.	Contact software support.
Could not obtain port from PortManager [PortManager name] - PortManager object is no longer served from its previous server/port.	Software is running where the PortManager was expected to be found, but the desired PortManager is not there. Meanwhile, the system will automatically attempt to use next PortManager (if there are any more).	Could be a configuration problem in the CommService. Verify that the named PortManager is running.
Could not obtain port from PortManager [PortManager name] - Received CORBA SystemException failure.	System problem attempting to contact PortManager. Meanwhile, the system will automatically attempt to use next PortManager (if there are any more).	Call software support.
Could not use port for [DMS name] , it is not a data port. Poll unsuccessful.	Could not complete the specified operation. This is a bizarre software problem, where the Port being used is not a DataPort capable of transmitting data.	Verify the device and PortManager configuration and retry the operation.
DMS message not valid: [description]	Message to be put on sign is not valid (banned word(s) found).	Correct message and resend.
DMS Message not valid: cannot be blank.	Attempt to put a blank message on a sign via a traffic	Contact software support.

Message	Explanation	User Action
	event. This is not the same as blanking a sign, this is actively putting a message on the sign which contains no characters or only spaces. (A blank message can be put on the sign in maintenance mode, but not online through a traffic event.) Indicates a software error, GUI or Traffic Event Service should not make the attempt.	
Failure getting status via FMS: [description].	Could not poll or get extended status for the device for the reason provided in [description]. This is a software problem of some sort, an unexpected error occurred.	Contact software support.
Message cannot be validated: [description]	Message to be put on sign cannot be validated. Probably the Message Utility Service is down or unreachable.	Verify that Message Utility Service is running.
Message will not fit on sign.	Message is too big to fit on sign (GUI should not have allowed attempt).	Contact software support.
Poll [DMS name] failed: [description] .	Could not poll or get extended status for the device for the reason provided. The device is using a new protocol, or there are line or communication problems.	Verify the device configuration and retry the operation
PortManager [PortManager name] could not return a Port - unexpected failure: [description];	Totally unexpected failure in the PortManager. Cryptic details will be provided. Meanwhile, the system will automatically attempt to use next PortManager (if there are any more).	Contact software support.
PortManager [PortManager name] could not return a Port – Port did not become available within the specified timeout.	All ports of the required type (ISDN/POTS) at the specified PortManager are in use or out of service. The system will automatically attempt to use	None required.

Message	Explanation	User Action
	next PortManager (if there are any more).	
PortManager [PortManager name] could not return a Port - PortManager is unavailable.	PortManager has been known to run previously, but cannot be contacted now. Either it is not running or it cannot be reached over the network. The system will automatically attempt to use next PortManager (if there are any more).	Verify that the named PortManager is running.
PortManager [PortManager name] could not return a Port - PortManager does not serve ports of the requested type.	PortManager does not (ever) have any ports of the specified type (ISDN/POTS). Meanwhile the system will automatically attempt to use next PortManager (if there are any more).	Remove this PortManager from the list (Field Comms tab of DMS props) and specify a one with the correct type of port (or change the ISDN/POTS radio button if that is wrong).
PortManager [PortManager name] could not return a Port - PortManager failure: [description]	Unexpected failure in the PortManager. Details will be provided in [description]. The system will automatically attempt to use next PortManager (if there are any more).	Contact software support.
Put [DMS name] online failed: blank FAILED.	Could not blank sign prior to going online. Cannot put a sign online which we can't communicate with.	Attempt operation again. If it continues to fail then the sign controller may be broken.
Put [DMS name] online failed: could not initialize sign.	Could not communicate with a sign which has never been communicated with before. Cannot put a sign online which we can't communicate with.	Place sign in maintenance mode and then attempt to set the sign online.

Message	Explanation	User Action
Set msg, [DMS name] : failed: reason . Invalid response from device - response length ([length]) does not match the expected length of 4. Set test msg, [DMS name] : failed: reason . Invalid response from device - response length ([length]) does not match the expected length of 4. Set msg, [DMS name] : failed: reason . Invalid response from device - command type ([command type]) does not match the expected type of FP9500ProtocolDefs.IMMEDIATE_MESSAGE Set test msg, [DMS name] : failed: reason . Invalid response from device - command type ([command type]) does not match the expected type of FP9500ProtocolDefs.IMMEDIATE_MESSAGE Set msg, [DMS name] : failed: reason . Error setting beacons ([ON : OFF]) : [error message] Set test msg, [DMS name] : failed: reason . Error setting beacons ([ON : OFF]) : [error message] Set msg, [DMS name] : failed: reason . Error setting beacons ([ON : OFF]) : Invalid response from device - response length (resp.length) does not match the expected length of 4. Set test msg, [DMS name] :	These messages indicate some sort of problem communicating with the device down at the bit level while attempting to set a message online ("Set msg") or in maintenance mode ("Set test msg"). Probably a hardware problem with the device, or perhaps a line problem.	Retry the operation. If it continues to fail then log a problem report.

Message	Explanation	User Action
Set msg, [DMS name] : failed (SW problem): [description].	Some totally unexpected software error arose during processing. [description] will likely contain a description of an exception, like NullPointerException, ClassCastException, ClassNotFoundException, etc.	Contact software support.
Set msg, [DMS name] : failed: SW problem, [DMS name] , port not a DataPort.	Indicates a bizarre software problem which should never happen.	Contact software support.
Set test msg, [DMS name] : failed (SW problem): [description].	Some totally unexpected software error arose during processing. [description] will likely contain a description of an exception, like NullPointerException, ClassCastException, ClassNotFoundException, etc.	Contact software support.
Set test msg, [DMS name] : failed: SW problem, [DMS name] , port not a DataPort.	Indicates a bizarre software problem which should never happen.	Contact software support.
SW problem, [DMS name] , port not a DataPort. [description] unsuccessful.	Could not complete the specified operation. This is a bizarre software problem, where the Port being used is not a DataPort capable of transmitting data.	Verify the device and PortManager configuration and retry the operation.
SW Problem: Could not convert plaintext message to MULTI.	Software problem encountered converting a plaintext message to MULTI format.	Contact software support.
Unauthorized attempt to [description] [DMS name] [description].	Unauthorized attempt to perform some action. If received by a legitimate CHART2 user, indicates a software error, GUI should not allow attempt to be made.	Contact software support.

Many messages otherwise indicating success can also have the following warning messages appended:

Message	Explanation	User Action
- WARNING: Could not initialize sign.	A sign which has never been communicated to was put in maintenance mode, despite the fact that it could not be initialized. Some signs (FP9500) require initialization prior to first use.	No action required, initialization will be attempted on subsequent attempts to use the sign.
WARNING: could not push new config for [description] WARNING: could not push new status for [description]	Operation caused some data in the config or status of the DMS to change, but the new information was not successfully pushed out to the GUIs (or any other listeners) via the event channel. GUIs will report outdated information about the DMS unless/until another operation which also changes the config or status is successfully performed (with a successful push).	The user who requested the operation can perform a "Refresh" of the DMS, which should cause the correct information to be pulled into the GUI (but other users at other GUIs would never know that their GUIs are out of synch. Therefore it behooves the user who receives this message to report this problem immediately.
WARNING: could not persist new config for [description]	Specified data could not be stored to the database. Application will continue to run otherwise unaffected, with correct information in memory, but unless/until another operation which also requires config or status to be persisted is successfully performed (with successful persistence), there is risk of data loss/inconsistency if the DMS service is terminated and restarted.	
WARNING: could not persist new status for [description]	Specified data could not be stored to the database. Application will continue to run otherwise unaffected, with correct information in memory, but unless/until	

Message	Explanation	User Action
	another operation which also requires config or status to be persisted is successfully performed (with successful persistence), there is risk of data loss/inconsistency if the DMS service is terminated and restarted.	

Warnings of various types could also be output on a configuration change attempt, for parameters that are missing, out of range, or otherwise invalid. In such cases parameters that are valid are updated. Such warnings are indicative of a software error, as the GUI should prevent invalid parameters from being transmitted.